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ABSTRACTS

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Mass Surveys.—The mass chest X-ray survey has been a consistent part of the tuberculosis control program of the New York City Department of Health. Mass X-ray surveys and routine chest clinic examinations of the Department over the past ten years have reached an estimated half million individuals. The effectiveness and value of the mass survey is determined by the availability of facilities to classify promptly and properly the significance of the lesions found in the survey. This has been done by the Department of Health before a case is referred to a physician or to the district clinic. The Department of Health assumes the responsibility for all significant cases found. This responsibility may be shared with physicians or others so long as they are able to carry out the provisions of the Sanitary Code. In such cases, the Department requires biannual reports until such time as the case may be considered to be arrested. There have been three major objectives in the survey program: (*a*) to demonstrate the prevalence of disease according to age, sex, race and general economic status; (*b*) to demonstrate an efficient method of conducting a survey; (*c*) to stimulate the interest of others to set up within their own organization facilities to provide a regular periodic service. The first two objectives have been accomplished to a satisfactory degree. The third objective has been accepted and there is every reason to believe that in time an increasing number of organizations will assume their responsibility in this most important enterprise. (Author's Summary)—*Mass Survey in Tuberculosis Control, H. R. Edwards, New York State J. Med., February, 1945, 45: 269.*—(*P. Lowy*)

Fluorographic Survey.—Because of the technical advances made in the field of fluorography, mass surveys are now practicable as a means of answering several pertinent questions relating to the pathogenesis and prognosis of pulmonary tuberculosis: (*1*) how many cases are discovered by mass fluorographic surveys that would otherwise possibly not have been discovered until later? (*2*) how many of the cases discovered have so-called "open tuberculosis" (*3*) how many would recover without treatment and how many are in need of medical attention? (4) how are the figures for these groups related to different ages and the two sexes? In coöperation with the Central Fluorographic Archive of the Swedish Navy, a survey was conducted of all personnel in the Navy for the two years 1941 and 1942. A total of 44,072 persons was examined, of which 1,209 (2.74 per cent) were found to show some suspicious type of markings in the fluorograph. No women were included in the study. Fluorographic classifications were divided into four groups: (*1*) doubtful pathological changes, (*2*) calcifications, (*3*) indeterminate activity, which included both active and not definitely healed lesions, as well as exudative pleuritis, hilar adenitis, pneumothorax, (*4*) cavitations. Of the 1,209 suspect cases, the following distribution among the four classes was made: Group 1: 9.0 per cent; Group 2: 30.0 per cent; Group 3: 59.3 per cent; Group 4: 1.7 per cent. These figures, when related to the original total of 44,072 men examined, show Group 1: 0.25 per cent; Group 2: 0.82; Group 3: 1.63; Group 4: 0.05. X-ray examinations of 91.3 per cent of all the positive cases revealed an 8.4 per cent error of overdiagnosis

by the fluorographic method in Group 1: 97.5 per cent agreement in Group 2, calcifications; 65 per cent agreement in Group 3 where a considerable range of interpretation would be expected by virtue of the nature of the group; and 95 per cent agreement in Group 4, cavitations. Clinical examinations were carried out on almost all positive cases, including sedimentation rate, sputum cultures, gastric lavage and temperature measurement. Bacilli were found in 0.31 per cent of all cases originally fluorographed, or 36.3 per cent of all cases examined bacteriologically. The sedimentation rate was above 10 mm. in only 27.9 per cent of the cases, while the temperature and weight changes were not significant. These findings would justify the conclusion that beside the X-ray findings, only the bacteriological examinations and the sedimentation rate have played any rôle as clinical signs among the fluorographically positive cases. Two-year follow-up of the patients revealed that 21 cases had become active; 5 formerly active cases were healed or inactive; 9 previously healed had become open; 35 previously open had become closed and 14 previously open had died of tuberculosis. These data would indicate that the risk of death for the fluorographically suspect cases is double the normal mortality for the corresponding age groups, whereas the mortality for the open cases discovered by the survey appears to be four times less than the average of open cases (based on Berg's survey in Sweden between 1928 and 1934).—*The Fluorographically Disclosed Cases of Pulmonary Tuberculosis and Their Early Prognosis, A. Nelson, Acta tuberc. Scandinav., 1946, Supplement XVI.*—(*P. Q. Edwards*)

Photofluorography.—The object of mass chest examinations by the cheap method of photofluorography is not only the discovery and treatment of the individual case of tuberculosis, but also the closing off of the source of infection. The present work began in 1939, and was the result of a concerted attack on the disease by physicians, the state, the army, social service institutions and industry. In Zürich canton 15,447 were filmed, of which 5,931 were workers, 2,066 school and hospital personnel, 1,058 state personnel, 864 patients in hospitals, sanatoria and insane asylums and 5,528 soldiers. A roentgenologist, X-ray technician and assistant operate the machine and read the films, helped by four assistants from the organization being filmed. The findings are indexed according to a special key, and classified into absolutely important, relatively important and insignificant. All those with with suspicious chest findings are referred for further work or 'clarification'. The general medical practice is used for this, and the patient may choose anyone he wishes. In cases of tuberculosis the problems that are handled are: medical treatment of the patient; care for the family, especially economically; and care for the patient after medical care is completed, including finding an appropriate job.—*Die Schirmbildphotographie, H. R. Schinz & F. Kollbrunner, Schweiz. med. Wchnschr., October 13, 1945, 75: 897.*—(*J. Gerstein*)

Tuberculosis in Tropics.—Although exact figures are not available, observers agree that the incidence of tuberculosis among the natives of British West Africa is high. Under the circumstances, hospital admissions naturally do not reflect the actual incidence of the disease; but it is worth mentioning that in the Gold Coast one in every nine hospital deaths is due to tuberculosis. Post mortem examinations reveal that the bronchopneumonic and miliary forms of tuberculosis are most common, with acute cavitation and little evidence of fibrosis. Primary foci are not uncommonly found. A comprehensive program for the control of tuberculosis under the prevailing primitive conditions is outlined.—*Tuberculosis in British West Africa, R. B. Wellesley Cole, Bull. Nat. A. Prevention Tuberc., Great Britain, February, 1945, p. 5.*—(*P. Lowy*)

Tuberculosis in Deaconesses.—The mortality in deaconesses caring for the sick is 1.2 per cent, the same as in the general population. Of these, 21 per cent died of tuberculosis, as compared with 6.1 per cent in the general population. Pirquet tests and X-ray films are

taken on beginning work, and every six months for three years, then every year. Only persons with positive Pirquet tests are placed on tuberculosis service. Fifty-two per cent reacted positively at the onset, and 92 per cent after four to five years. Of 66 with changing Pirquet tests, 16 had clinically apparent disease and 2 died. The mortality and morbidity among children with changing Pirquet tests is even higher. Among 52 who began work with positive Pirquet tests, there were 3 cases of tuberculosis, all mild. It is recommended that all nurses be radiographed every six months until the age of thirty-five, and that all those not reacting to the Pirquet test, especially if young, be vaccinated with BCG.—*Diaconesses et tuberculose, E. Urech & P. Rochat, Schweiz. med. Wchnschr., June 9, 1945, 75: 504.*—(*J. Gerstein*)

Primary Tuberculosis.—The authors refer to Rich's premise that acquired resistance to tuberculosis in the human is on the bases that (*1*) the establishment and subsequent arrest of the primary complex are seldom followed by the occurrence of similar lesions despite opportunities for extraneous infection, and, (*2*) primary lesions characteristically undergo regression. The evidence that lesions of the primary complex are arrested or "healed" and hence are unlikely to contain living tubercle bacilli is based on histological studies, and on inoculation of material from lesions of the primary complex into guinea pigs. Young Ghon tubercles have been shown to contain many stainable acid-fast bacilli, while older lesions yield no or only a small number of viable bacilli on animal inoculation. Infants with primary infection are more likely to suffer from infection beyond the limits of the primary parenchymal lesion and adjacent nodes with subsequent death. Therefore, it appeared important to determine how frequently tubercle bacilli could be demonstrated by animal inoculation in the primary complex of children dying from nontuberculous causes. Twenty-nine cases were studied over a six-year period. Some specimens were obtained locally and some by mail. About half the specimens had been packed in borax. From each parenchymal lesion suspensions were prepared for subcutaneous inoculation of 2 guinea pigs. Other preparations were made from hilar lymph nodes. In 20 cases only parenchymal lesions were available. In 7 instances hilar nodes as well as parenchymal material were received. In 2 cases the disease had been limited to the hilar nodes. Unless they died sooner, guinea pigs were killed and autopsied at eight weeks. The youngest child in whom virulent bacilli were found was 3 months of age, while the oldest was 11 years. In only 5 of the 29 cases were tubercle bacilli demonstrated. If, as seems likely, the primary complex in most instances tends to become sterile during the early months or years, then the primary infection is usually a benign disease when the environment is good. So long, however, as viable tubercle bacilli exist they must be regarded as potential instigators of the reinvasion type of pulmonary tuberculosis. Cellular reactions or other morphological evidence of activity of a tuberculous lesion can seldom justify more than a presumption that the lesion contains viable tubercle bacilli, especially if the lesions are encapsulated, fibrotic, caseous or calcified. It is regrettable that no knowledge is available regarding the tuberculin reactions in this series. Many have suggested that, as the primary complex becomes encapsulated and finally inactive, previous sensitivity to tuberculin may diminish or be lost. Failure to demonstrate living bacilli in 24 of the 29 children supports the belief that tuberculin sensitivity in children may be transitory and that, in children whose tuberculosis is limited to the primary complex, the continuation of sensitivity to tuberculin is probably related to the infectivity of the tuberculous focus. It is logical to assume that foci which no longer contain viable bacilli will eventually cease to maintain sensitivity. Loss of this sensitivity does not necessarily mean loss of immunity. Norwaal, in a study of 112 children with a Ghon complex, found between one-quarter and one-fifth negative to the second strength of PPD, indicating that, as in this series, probably there was no longer any antigen being

absorbed from the tuberculous lesions and, therefore, viable bacilli were no longer present. In such cases it seems unlikely that the adult type of tuberculosis could develop except by reinfection. Follow-up on negative reactors with a Ghon complex might help to determine whether such healed infection renders a person living in a tuberculous environment refractory to the disease, produces a second primary complex or eventually produces the adult type of tuberculosis. If the results of this study are a true reflection of the infectivity of the lesion of the primary complex in children without concomitant other tuberculous disease, one may conclude that the tubercle bacilli responsible for primary lesions in childhood tend, in most instances, to become avirulent or disappear.—*Infectivity of the Primary Complex of Tuberculosis of Childhood, W. H. Feldman & H. F. Helmholz, Am. J. Dis. Child., October, 1945, 70: 201.*—(*K. R. Boucot*)

Primary Tuberculosis.—Tuberculous infection is most dangerous in infants, and the prognosis in this age group is least favorable. In older children the infection is usually benign. Calcification and healing of the primary complex and of the involved mediastinal nodes is the rule, and the child is ready for discharge from the sanatorium in six to twelve months. In a certain number of cases, however, evidences of continued activity persist. The temperature remains slightly or intermittently elevated, the sedimentation rate remains rapid, and the child does not thrive properly. Such children are subject to late complications, such as development of bone lesions, cervical adenitis and pleural effusions. It is doubtful that tuberculosis of such a progressive nature is due to a large initial infection dose. It seems more likely that active tuberculous foci persist in partially calcified mediastinal nodes, or that local and hematogenous spreads occur from an unhealed lung focus. The prognosis of children in whom primary tuberculosis causes a long illness is probably poor.—*Primary Tuberculosis in Children Causing Long Illness, J. V. Hurford, Lancet, November 17, 1945, 246: 624.*—(*H. Marcus*)

Hilar Shadows in Children.—The author has examined more than a thousand juvenile contact cases. Five per cent of these children presented definite proof of tuberculous infection. The mere presence of hilar shadows was not considered proof of glandular disease as in children, the pulmonary vessels are relatively large and overshadow the lymph nodes. The majority of the shadows near the mediastinum and the heart border are not glandular shadows. The paratracheal and tracheobronchial lymph nodes on the left are obscured by the heart shadow. In childhood tuberculosis, the primary pulmonary lesion is found generally at the level of the interlobar fissure. Shadows near the border of the heart very seldom represent tuberculosis but mostly a mild pulmonary infection. Only massive tumor formation of the mediastinal nodes will give X-ray evidence. These are generally hopeless cases. In the majority of the cases of childhood tuberculosis, the glandular involvement can not be detected on X-ray films. It is probable that the glandular lesion, which every child must have had, as 97 per cent of the adults show calcifications, is too small to be seen on the X-ray film. As long as the hilar shadows do not show any gross deformity there is no reason to suspect a primary tuberculous infection. But even if the hilar shadows are enlarged and deformed, they may not be of tuberculous origin, especially if they are situated in the lower portion of the hilum. In this case the Mantoux test will give further information. In less than year old infants a positive Mantoux test is proof of tuberculous infection. After two years a positive reaction indicates only the degree of allergy of the child. The author has examined a number of children with unquestionable primary infection. Some of them showed, on a later examination, only slight enlargement of the hilar nodes but no other characteristics. These are considered as entirely healed cases of primary tuberculosis. It is emphasized that hilar shadows without special characteristics are very frequent in children and are not of any pathological significance.—*Consideraciones sobre las imagenes hiliares en el nino,*

A. Tola, Rev. méd. peruana, June, 1945, 18: 200.—(W. Swienty)

Sensitivity to Tuberculin and Prognosis.—The present study was undertaken to test the theory that, in the absence of overwhelming disease, the prognosis of tuberculosis in young children is related to the degree of their hypersensitivity to tuberculo-protein. The material for the study was drawn from the records of children followed in the Tuberculosis Clinic of the Harriet Lane Home. The criteria for admission to the clinic demand that the child be less than two years of age and that he be either infected with tuberculosis, as demonstrated by a positive tuberculin test, or known to be exposed to sputum-positive tuberculosis, and therefore in unusual danger of becoming infected. In the routine operation of the clinic, children are tested with tuberculin, and X-ray films of their chest are taken upon admission. Both procedures are repeated at intervals thereafter, and about once each year after the acute stage of their disease is passed. Old Tuberculin was used exclusively for skin testing, starting with 0.001 or 0.01 mg. of tuberculin, the dose being increased, if negative, up to and including 1.0 mg. All tests were performed by the intracutaneous injection of 0.1 cc. of solution. The group under study consisted of 207 children, all tuberculin-positive. There were nearly four times as many Negroes as whites. There were 5 more males than females in the whole group. All patients followed for a period of less than two years have been discarded from this study, with the exception of those who died. The maximum period of follow-up was seventeen years, the mean period being approximately eight years. Thirty-four reacted to not less than 1.0 mg. of tuberculin. Nineteen (56 per cent) of these subsequently lost their hypersensitivity and did not regain it during the period of study. None of these 34 children showed demonstrable parenchymal lesions of calcification on X-ray films of the chest; none developed extrapulmonary tuberculosis and none died. Twenty-six reacted to 0.1 mg. of tuberculin. Six (23 per cent) of these subsequently lost their sensitivity to this dose and did not regain it. Only one of the 26 had parenchymal involvement and 3 showed subsequent calcification on chest roentgenograms. Two had extrapulmonary tuberculous manifestations of the disease; none died. In the highly sensitive group, 103 children reacted positively to the 0.01 mg. dose and 44 gave vesiculated reactions to 0.1 mg. Of those positive to 0.01 mg., 43 per cent had non-calcified parenchymal lesions, 62 per cent of the 103 developed intrathoracic calcifications, 25 per cent had manifestations of extrapulmonary tuberculosis, 14 per cent died, 12 per cent had no evidence of tuberculosis apart from a positive tuberculin test Of the 44 giving vesiculated reactions to 0.1 mg., 50 per cent had parenchymal lesions, 77 per cent developed intrathoracic calcifications; 27 per cent had extrapulmonary manifestations of the disease, 16 per cent died, 12 per cent had no evidence of tuberculosis except for a high degree of sensitivity to tuberculin. No child in the markedly hypersensitive group sustained a persistent loss of sensitivity to the 0.01 mg. dose of tuberculin. According to this study the prognosis for children under three years reacting positively to not less than 1.0 or 0.1 mg. of tuberculin (except in overwhelming disease or in a very early stage of the infection) was good, in sharp contrast to those children who were highly sensitive where the prognosis was bad. The degree of hypersensitivity was closely related to the extent of the tuberculous lesions.—*The Relation of the Degree of Sensitivity to Tuberculin to the Persistence of Sensitivity and to Prognosis in Young Children, Lydia B. Edwards & Janet B. Hardy, Bull. Johns Hopkins Hosp., January, 1946, 78: 13.—(J. S. Woolley)*

Pleural Reaction in Primary Tuberculosis.—The demonstration of pleural effusion in primary tuberculosis of the lungs is not common. This is felt to be due to inadequate methods of routine examination. The method devised by Laurell permits demonstrating small pleural exudates by radiography. Examination of the recumbent patient with horizontal X-rays demonstrates with greater

clarity the presence of small effusions. By alterations in position of the patient and apparatus as described by Laurell, smaller effusions and more delicate detail can be studied. The authors recognized effusions of 3 to 5 ml. by methods which are improvements of the original technique of Laurell. The question as to whether primary tuberculous infection of the lungs can be roentgenographically differentiated from certain types of post-primary infections is briefly discussed. No other type of tuberculosis of the lungs is associated with such a powerful hilar reaction as primary tuberculosis. Ten cases are reported and in 9 of these the presence of a pleural exudate on the homolateral side of the infection could be demonstrated radiologically; this fluid was demonstrable only with the patient in the recumbent position. The quantity of fluid varied from 7 to 150 ml. There seemed to be a relation between the quantity of fluid and the length of time that had elapsed between the onset of the disease and the examination of the patient. Those appearing early in the course of the disease presented the largest exudates. Apparently there is a rapid absorption in such types of pleurisy, as shown by the fact that patients seeking treatment a week after the onset did not present large exudates. Examination of the fluid obtained by thoracocentesis in primary tuberculosis of the lungs revealed an increase in the albumin content above the normal of 3 per cent and an increase in the cell count above the normal of 5,000 per cc. but seldom above 10,000 per cc. Differential counts reveal mononuclear cells predominating in normal fluid and polynuclear cells predominating in the exudates of primary tuberculosis, at least in the initial or acute phase. In primary tuberculosis of the lungs the demonstration of pleural exudates indicates that the disease is in an acute stage though clinical signs and symptoms be lacking. A pleural exudate may exist before parenchymal changes in the lung are demonstrable radiographically.—*The Reaction of the Pleura in Primary Tuberculosis of the Lungs, R. Muller & S. Lofstedt, Acta med. Scandinav., September 26, 1945, 122: 105.*—(*E. R. Loftus*)

Minimal Tuberculosis.—The study is based on 100 cases of minimal pulmonary tuberculosis conforming to the N. T. A. classification. Only those cases were included which had had at least two years' observation. There were 42 females and 58 males. The age range was as follows: 47 between 15 and 25 years, 40 between 25 and 35 years, 13 over 35. This age distribution is as anticipated because Chilean morbidity from tuberculosis is highest in the 20 to 30 year old age group. Six were private patients and 94 were insured workers, either civil servants, private employees or journalists. The sputum studies included culture and animal inoculation in all but 14 cases: 33 per cent had positive sputum or gastric contents at the beginning of the study. Of these, 30 were converted and remained negative for at least two years. Conversion took place in six months to one year, except in one instance in which sputum remained positive for three years. Subjective symptoms in the 33 initially positive cases were present in 28 or 84.4 per cent. They consisted of weight loss, cough, expectoration, toxemic and dyspeptic manifestations, hemoptysis and back-ache. Of the 67 initially negative patients, 18 or 28.8 per cent subsequently became positive. Among 49 patients who were never positive, 33 cases of manifest activity occurred during the five-year study. Of these 33, 23 tended to improve and 10 to progress. In this latter group, persistent search by culture and inoculation failed to yield positive results in 16 cases. Of the 18 initially negative cases that subsequently became positive, one showed no change in the lesion, 3 progressed favorably and 14 unfavorably. Appearance of bacilli in the sputum almost invariably coincided with spread. Of 33 initially positive cases, 10 or 30.3 per cent underwent spread. Of 67 initially negative cases, 24 or 35.8 per cent also underwent increase in their lesions. Therefore, the finding of bacilli in cases of minimal pulmonary lesions has no prognostic significance. Forty-seven patients had normal sedimentation rates, while 53 had increased rates. Of the 47 with normal sedimentation rates, 9 remained stationary, 15 underwent exacerba-

tion, and 29 showed subsequent improvement. Therefore, this group had an unfavorable course in 28.3 per cent. No pleurisy was observed in this series. Cases with normal sedimentation rates have a less favorable evolution than those with an initially elevated rate. The sedimentation rate does not have a high prognostic value in minimal tuberculosis. Collapse therapy was used only when there was an unfavorable course, especially in those cases where cavity formation occurred. When lesions were exudative in appearance, the patients were placed in sanatoria on a strict rest regimen. Recovery was gauged by stability for a minimal period of two years. This occurred in 40 patients who underwent rest cure at home, 19 who underwent rest cure at a sanatorium and in 14 cases treated by pneumothorax. Of the unfavorable cases, 11 were on rest cure at home, 8 on rest cure in a sanatorium and 6 had pneumothorax. There were 2 deaths in this group. An exact appraisal of therapy is not possible because of changes and combinations of therapy. Abnormal physical signs were present in only 11 cases. They consisted of changes in resonance, vesicular murmur or fine râles. Contact histories were reliable; 37 were contacts to patients with a positive sputum, 18 of these had had heavy exposure through contacts with parents, brothers or spouses.—*Analysis of 100 Cases of Minimal Tuberculosis, H. O. Puelma & G. Grebe, Dis. of Chest, September–October, 1945, 11: 375.*—(*K. R. Boucot*)

Cavity Closure in Tuberculosis.—Four cases of pulmonary tuberculosis that came to autopsy are presented, with proof that occlusion of the bronchus draining a cavity precedes closure of the cavity. It is also felt that such bronchial occlusion is the essential and main factor in certain healing of cavities.—*Kavernenschwund und Verschluss der Kavernenbronchien, W. Berblinger, Schweiz. med. Wchnschr., October 27, 1945, 75: 941.*—(*J. Gerstein*)

Rheumatism and Tuberculosis.—Tuberculosis of the joints occurs in many forms. It may vary from an acute inflammation of several joints (type Bouillaud) to a chronic deforming arthritis (type Charcot). Tuberculous rheumatism is a pathological entity proven more and more frequently by obtaining cultures of tubercle bacilli on Loewenstein's medium. The following case histories of tuberculous rheumatism are given: (*1*) In a 23 year old man with fibrocaseous pulmonary tuberculosis conversion of sputum was achieved by a two-stage thoracoplasty. The patient developed pains in several joints, without swelling, which were resistant to salicylates. (*2*) A 23 year old man whose family history revealed several cases of tuberculosis was observed. Since the age of eleven he had complained of pains in various joints without swelling. At the age of twenty-two he started to have pain in his spine and to develop a marked kyphosis. A chest roetgenogram showed diffuse clouding of both apices. The gastric juice contained acid-fast bacilli. (*3*) A 16 year old boy with acute polyarthritis was seen, who had had similar attacks at the age of eight and eleven. A chest roentgenogram revealed no abnormalities, the gastric juice was negative for tubercle bacilli, a patch test was positive. Examination of the heart showed numerous premature beats. The knees and the right elbow were swollen and painful. Fluid withdrawn from the left knee contained tubercle bacilli. The disease was not influenced by the administration of salicylates.—*Rhumatisme et tuberculose, R. Desmeules, L. Rousseau & Ph. Richard, Laval méd., January, 1946, 11: 35.*—(*G. C. Leiner*)

Chronic Miliary Tuberculosis.—The problem of chronic miliary tuberculosis brings forth the questions as to whether this condition really exists and, if so, by what origin, and in what way eventual healing can be explained. Secondly, the problem arises of the differential diagnosis from lung conditions having similar roentgenological appearance. These include miliary carcinosis, coniosis, multiple pyemic small abscesses, leukemic infiltrations of miliary form, disseminated influenzal pneumonia and bilharziosis of the lungs. Two other diseases which have very similar radio-

logical appearances are: first, the idopathic progressive brown induration of the lung where the minute spots seen in the film are due to hemosiderosis caused by recurring hemorrhage; and second, the diffuse myomatosis or fibrosis of the lung with formation of cysts. In the second condition, which shows a relation to tuberous solerosis, the small cysts may not be apparent in the ordinary roentgenogram but may be clearly apparent in tomographic films. The differentiation of chronic miliary tuberculosis and these last two mentioned conditions is reportedly not difficult, but more difficulty is encountered in distinguishing chronic miliary tuberculosis from pulmonary congestion, Besnier-Boeck's disease and tuberculous broncho-pneumonia with confluent foci. It appears necessary to establish severe criteria in the diagnosis of chronic miliary tuberculosis. These include positive tuberculin tests; history of contact; if possible, the presence of tubercle bacilli in gastric lavage or sputum; extrapulmonary foci that could arise only by blood stream dissemination; the presence of foci of about the same size in both lung fields and the uniform dissemination of these foci. Fourteen cases of chronic miliary tuberculosis are reported. They occurred in children above two years of age. Most of these have shown extrapulmonary involvement which could be explained only on the basis of blood stream dissemination. Tuberculin tests in all cases were positive. Tubercle bacilli were demonstrable in the gastric lavage or sputum of 8 of these cases. Different hypotheses have been suggested by various authors to explain chronic miliary dissemination. Many investigators have remarked that due attention should be given to the reaction of the lymphatic system in judging a hematogenous dissemination, because such dissemination originates rather often from caseated lymph nodes. One must also consider the fact that hematogenous dissemination is often followed by involvement of the lymph vessels and that the clinical picture of a lymphangitis resembles that of chronic hematogenous tuberculosis. Another hypothesis assumes that in the explanation of the chronic course of a miliary tuberculosis the quantity of the disseminated tubercle bacilli in the blood stream and the repetition of this dissemination are of greatest significance. An argument in favor of this hypothesis, assuming that the hematogenous seeding occurs but once or, if recurring, spills very small numbers of organisms, is the relatively rare occurrence of meningitis. Broadening of the upper mediastinal shadow was observed in the majority of cases, both lethal and non-lethal cases. In those instances in which post mortem examinations were made, there were large caseated paratracheal lymph nodes. In acute miliary tuberculosis massive quantities of tubercle bacilli enter the circulation and the filtration by the lung is ineffective, but in those instances in which the dissemination occurs but once the filtration by the lung is effective. There are exponents of the argument that chronic miliary tuberculosis results from the dissemination of dead or attenuated tubercle bacilli. This hypothesis is strengthened by the number of cases which are accompanied by lupus. If it is accepted that papulonecrotic tuberculids are caused by bacilli of decreased virulence, then the arguments for dissemination of attenuated bacilli is further enhanced, for the occurrence of tuberculids has been repeatedly observed in chronic miliary tuberculosis.—*Chronic Miliary Tuberculosis, S. van Creveld & G. J. Huet, Acta med. Scandinav., February 12, 1943, 113: 135.*—(*E. R. Loftus*)

Atypical Tuberculosis and Sarcoidosis.—There are indefinite transitions in the clinical as well as pathological-anatomical manifestations of tuberculosis. This is seen in the acute septic form at one extreme, the usual exudative-productive as the commonest form and the atypical chronic miliary tuberculosis at the other extreme. The concept has gradually developed that these morphologically different manifestations are due to a different manner of reaction on the part of the cells and to the different sensitivity of these cells to the tubercle bacillus and its products. This sensitivity varies extremely, first from individual to individual, second from organ to organ and fi-

nally, from time to time in the same individual. The question as to whether immuno-biological or other factors determine a manner of reaction which causes atypical forms of tuberculosis, leaves two theoretical possibilities as answers. Clinically, there may be still more malignant forms than the pneumonic and, conversely, there may exist specific benign forms with pure productive changes and especially strong tendencies to recover. In the first instance, specific references are given to the so-called acute atypical miliary tuberculosis which occurs without obvious macroscopical findings and makes its appearance under the picture of lymphatic leukemia. At the opposite extreme are those cases of chronic miliary tuberculosis which have in some instances been cured and those related or identical processes that assume yet another form. Histologically the resemblance of Boeck's sarcoid to tuberculosis is so great that on the whole the two kinds of changes cannot be distinguished from one another. In particular there is no distinction between extremely chronic miliary tuberculosis and Boeck's sarcoidosis. The failure to find tubercle bacilli by any means in sarcoid tissue and the general anergy to tuberculin are the main factors that place sarcoidosis on a nontuberculous basis. But the tuberculin reaction is not always positive in tuberculosis and a significant percentage of negative tuberculin reactions occurs in chronic miliary tuberculosis. The etiology of the disease must be determined by biopsy or post mortem examination. The characteristics of Boeck's sarcoidosis are its extremely chronic course and its tendency to fibrous changes and healing, exactly in the same way as is seen in the most chronic miliary tuberculosis. In the opinion of this author, anyone who can draw a sharp line between chronic miliary tuberculosis and classical tuberculosis on one hand and Boeck's sarcoidosis on the other, draws positive conclusions on negative premises. The author also states that histological examination of excised tissue, reportedly from cases of Boeck's sarcoidosis, revealed very small, acid fast, round or oval bodies scattered in the epithelioid tissue. The significance of these bodies is at present unknown.—*Atypical Tuberculosis—Boeck's Sarcoid, R. Opsahl, Acta med. Scandinav., March 18, 1948, 113: 267.—(E. R. Loftus)*

Mediastinal Dislocation following Pneumothorax.—A 35 year old female was seen with severe dyspnea, cough, wheezing in the chest, sputum positive for tubercle bacilli. She had had pulmonary tuberculosis since 1932. A right pneumothorax had been induced in 1937 and abandoned after four years. The lung, however, did not reëxpand and roentgenological examination in 1944 showed displacement of trachea, heart and mediastinum to the right and elevation of the right diaphragm. An upper stage, three-rib thoracoplasty with apicolysis was done on the right side, which allowed the trachea and heart to return to an almost normal position. Two days after the operation there was considerable improvement in the patient's breathing.—*A Case of Extreme Mediastinal Dislocation Complicating Tuberculosis, W. L. Phillips, Clin. Proc. (Cape Town), October, 1945, 4: 459.—(G. C. Leiner)*

Readhesion after Intrapleural Cauterization.—Three forms of obliteration of the pneumothorax space are mentioned: (*1*) The acute obliteration resulting from loss of air through cannula tract. While positive intrapleural pressure engendered by severe post-operative coughing or vomiting are most frequently responsible, in some cases endobronchial tuberculosis may be a factor by producing a check-valve type of bronchial obstruction that result in rapid reëxpansion of the lung. (*2*) Secondary obliteration of areas recently separated by the pneumonolysis occurs within a week or two of operation. (*3*) Late obliteration, the sequel of postoperative effusion. This is outside the scope of this paper. The factors aiding readhesion are chiefly the presence of raw exuding cauterized surfaces, particularly projecting stumps, traumatic pleuritis or blood. In some cases the pleura is covered with a fine pellicle of organized lymph which adheres readily if two surfaces are allowed to come into

contact. When any deposit of fibrin, lymph or blood occurs on the pleura the coagulum is invaded by connective tissue elements. Hence vascular recent adhesions, rich in capillaries, springing from an actively inflamed visceral pleura, are the ones, after division, mostl likely to readhere when given a chance. The incidence of this complication is about 3 per cent of reported cases. The prevention of readhesion is accomplished by judicious use of premedication to avoid postoperative vomiting; avoidance of prolonged operative sittings; careful massage, closure and compression of cannula puncture wounds; sedation of cough after operation. Frequent fluoroscopic examinations to ensure adequate lung collapse are essential. It is better to keep the lung well collapsed for some weeks after section of adhesions to allow full retraction of severed tissues and maximum benefit from the operative procedure. To this end attention to posture in the ten to fourteen days after surgery is of great importance, particularly in cases where the lung collapse is unsatisfactory, the pleura inflamed, operative trauma extensive and when cauterization is followed by effusion. The lung becomes fixed most easily to that part of the thorax where there is the least respiratory movement—usually to the posterior parts; hence during fluoroscopy particular attention should be given to the costo-vertebral gutter. In treatment, the attempt to break down obliteration by frequent refills is first, but often unsuccessful. In these cases reoperation should not be long delayed. The author reports seven cases; in five reoperation was done immediately. There was usually direct readhesion between the visceral and parietal pleurae in addition to readhesion of stumps. Long slender newly formed bands or sheets were rarely found. In early reoperations it was possible to separate the readherent stumps and pleurae by blunt dissection. The outer layer of the readhesion was invariably the densest part. When granulation tissue was encountered, in cases done after a longer interval, detachment was still possible but accompanied by considerable parietal oozing. In one of the author's cases tuberculous empyema followed, and in another a persistent pleural effusion developed.—*Readhesion after Intrapleural Cauterization, R. J. C. Maxwell, J. Thoracic Surg., June, 1945, 14: 194.*—(*W. M. G. Jones*)

Oils in Disinfectant Oleothorax.—If tubercle bacilli persist, with or without varying degrees of purulency, approximation of pleural surfaces is ultimately demanded. The empyema cavity becomes of more immediate importance than the lesions in the underlying lung, not only because of the toxemia produced by the empyema, but also because the extent of the surgery necessary for the lung lesions is generally less formidable than that required for the empyema. Many drugs and solutions have been used in the treatment of tuberculous empyema, but all with indifferent success. Matson, in 1932, reported 60 per cent satisfactory results in 50 cases of empyema treated with gomenolized oil. Others have used 4 per cent cottonseed oil with similar results. Empyema always results from caseation and ulceration of subpleural tuberculous foci. The greater incidence of both serous effusions and empyema in mechanically unsatisfactory pneumothoraces is explained by the fact that the adhesions which prevent collapse and the effusion or empyema are themselves caused by subpleural tuberculous foci. Following Matson's suggestion, the authors used both cod-liver oil and peanut oils because of their irritating effects on the pleura. As chemical disinfection of an infected and constantly reinfected pleura is considered impossible at present, irritant oils act beneficially by producing an inflammatory reaction which walls off the subpleural focus, prevents the constant reinfection of the pleural surfaces from this focus and encourages pleuritis which may eventually obliterate the empyemal space. Moreover the oils inhibit the growth of tubercle bacilli and markedly reduce the toxic effects of the tuberculous infection. The immediate symptomatic reaction to oleothorax is most marked in patients with a mild infection, and least marked in those with a very purulent empyema. Within from four to eight hours after instillation of the first unit of

oil (usually 50 cc.; subsequently larger amounts are used according to reaction) there will be pain in the chest which rarely persists more than forty-eight hours. There is also some malaise and a mild temperature reaction. The toxemic symptoms of empyema rapidly and at times dramatically disappear within a few weeks by which time the fluid in most cases has become thin. Occasionally the fluid though scanty remains purulent but even these patients were symptom free. This improvement is followed by increase in general well-being and return of appetite and a gain in weight. These patients become a much better surgical risk should surgery be necessary. The authors treated 20 patients: 6 of these reëxpanded their lungs without requiring thoracoplasty; of the remaining 14, 10 now have oleothoraces which are negative for tubercle bacilli. In the conduct of oleothorax the authors stress the necessity for frequent examination of the patient with periodic removal of pus or fluid and the maintenance of negative intrapleural pressures to avoid extension of infection or oil along needle tract or development of bronchial fistula.—*Studies in Oleothorax: II. The Use of Oils in Disinfectant Oleothorax and in the Reexpansion of the Lung in Tuberculous Empyema, P. D. Crimm & J. J. Westra, J. Thoracic Surg., August, 1945, 14: 270.*—(*W. M. G. Jones*)

Closed Extrapleural Pneumonolysis.—This is a report of 50 operations in which some degree of extrapleural dissection was performed. These cases represent 35 per cent of 143 intrapleural pneumonolyses. In all these cases the attachments were considered unsuitable for division by the accepted criteria for intrapleural pneumonolysis, yet a satisfactory collapse was obtained in 35 or 70 per cent of them by extrapleural dissection technique. If the 13 operations performed for exploratory purposes in doubtful cases are excluded, the operation was successful in 31 out of 37, or 84 per cent. Twenty-six cases had no postoperative fluid. Large postoperative bleeding followed in 3 of the patients who had partial dissection (23 per cent) and in 3 others. There were 6 cases of empyema, 5 being tuberculous, (10 per cent). Regarding technique, the Coryllos thermal cautery unit was used in all cases. In preparation for extrapleural dissection the pleura was elevated with 1 per cent novocain and the pleura incised one to 2 cm. from the lung. The extrapleural separation was carried out with the aid of a new type of sponge carrier and dissector designed by the author (made by the American Cystoscope Makers). Bleeding was controlled by the cautery, which was also used for dense fibrous strands. Small amounts of blood were wiped away by the dissector, larger accumulations being aspirated by means of a long suction tube. The presence of tubercles on the lung was considered to be no contraindication to extensive stripping if there were several centimeters from area of division. If they were on the parietal pleura the operation was not attempted. There are 4 illustrative case reports.—*Closed Extrapleural Pneumonolysis, J. S. Conant, J. Thoracic Surg., October, 1945, 14: 369.*—(*W. M. G. Jones*)

Death Due to Pneumoperitoneum.—The case is reported of a 48 year old patient who was to be treated with pneumoperitoneum for tuberculosis of the right upper lobe. The induction of the pneumoperitoneum was uneventful. At the second refill the needle was introduced cautiously into the abdominal wall, two fingers to the left and below the umbilicus. At first the manometer showed no oscillations and there was no passage of air. The needle was introduced somewhat deeper, whereupon 300 cc. of air went in rather easily. This was followed by sudden cough, general malaise and respiratory distress. The needle was withdrawn. A few minutes thereafter generalized convulsions of short duration set in. Coma developed and the patient died twenty to twenty-five minutes later. Autopsy revealed a hematoma in the rectus muscle. No injury of a major vessel could be found. The peritoneum showed no evidence of puncture. The intestinal loops were normal. Section of the heart revealed the blood to be foamy. The

brain was normal in appearance. There was tuberculosis of the right upper lobe and some edema of the left lung. The cause of death was attributed to air embolism in the lungs and possibly air embolism of the brain.—*Accident mortel au cours du pneumo-péritoine, G. Roche & J. Giron, Rev. de la tuberc., 1944-1945, No, 7-9, 9: 109.*—(*V. Leites*)

Thoracoplasty Binder.—This is a description, with good pictures, of the thoracoplasty binder which has been in use at Herman Kiefer Hospital for the past ten years. Binders are applied ten days after the second and succeeding stages of thoracoplasty and are kept on beween operations and afterward until the chest wall is firmly rebridged, about three months after the last stage. The binder is simply a three or four inch soft sponge rubber ball which is strapped in the thoracoplasty depression under an encircling piece of stockinette by three three-inch strips of adhesive slightly longer than the circumference of the patient's chest. These are applied in the sitting posture. X-rays films are taken when the binder is off. This binder has superseded all others and has been a great help in controlling paradoxical respiration and keeping revision operations at a minimum.—*A Thoracoplasty Binder, E. F. Skinner, J. Thoracic Surg., April, 1945, 14: 171.*—(*W. M. G. Jones*)

Skin Flap for Large Cavities.—The author presents 2 cases with extensive bilateral tuberculosis and cavitation not suitable for any form of collapse therapy. A skin flap was used in each with excellent results and eventual rehabilitation. The procedure is not difficult and cases do not require close continuous aftercare.—*Drainage of Cavities in Bilateral Pulmonary Tuberculosis, V. S. Randolph, J. Thoracic Surg., October, 1945, 14: 395.*—(*W. M. G. Jones*)

Lobectomy versus Thoracoplasty.—The physio-pathological aspects of these two methods of treatment for upper lobe lesions are discussed. Both have the same objectives in view, viz. to control or eradicate the diseased focus and permanently preserve the function of the remaining healthy lung. Thoracoplasty seems to be more successful, chiefly because it does preserve the function of the remaining healthy lung better than primary lobectomy, which necessarily entails overdistension of the lower lobes. Overdistension may be a precursor to emphysema. When a lung harbors a tuberculous lesion of low-grade activity, an unphysiological and undesirable condition exists which is not conducive to healing. The absence of X-ray evidence of disease in apparently healthy lung by no means rules it out. Tuberculosis is always bilateral, whether visible or not. Another factor of great importance is endobronchial tuberculosis which is present in all cases of tuberculosis with cavitation. When severe and producing obstruction, one finds either obstructive emphysema, suppuration, atalectasis or tension cavities. It is some form of this complication more than any other that defeats the aim of thoracoplasty and is advocated by the proponents of primary lobectomy as the chief indication for its use. However, at least 75 per cent of these cases with endobronchial disease respond to thoracoplasty, and in the few failures lobectomy can still be done with less risk and without overdistending the remaining lung. The evil effects of overdistension are best seen in the "good chronic" who heals his tuberculosis by atalectasis. One sees a reduction in the size of the chest, a decrease in costal movement or expandibility, contraction of the diseased area and compensatory distension of the remaining lobes or lung. At autopsy one sees both obstructive and overdistension-types of emphysema. Nevertheless it is recognized that there are many cases of apparent cure in which both upper lobes or a whole lung is destroyed by disease and the remaining lung shows severe overdistension without the picture painted above. These cases may be exceptions to the rule; and the overdistension is a very slow and gradual process in contrast to the rapid changes

subsequent to lobectomy. Another factor is that overdistension is not only unfavorable to healing, should tuberculous foci be present, but the bronchi in this area lose some of their normal motility, which is an important factor in favoring bronchogenic spreads. Thoracoplasty is successful because it utilizes four of the five basic principles of therapy: drainage (bronchial), immobility, relaxation and compression. The fifth principle, resection, is reserved for its failures. Bronchospirometric determinations on thoracoplasty patients show there is a significant reduction in function in only 25 per cent of the cases following a modern six-rib operation. Upper lobectomy should therefore be secondary to thoracoplasty failure and has not been difficult to perform when adequate exposure is obtained. —*Primary Upper Lobectomy versus Modern Selective Thoracoplasty in the Treatment of Tuberculosis, J. M. Chamberlain, J. Thoracic Surg., February, 1945, 14: 32.*—(*W. M. G. Jones*)

Pulmonary Resection for Tuberculosis.—Report of 17 lobectomies and 15 pneumonectomies for pulmonary tuberculosis done between October, 1940 and May, 1944. All of these were done by the hilar dissection technique. The most frequent indication for lobectomy has been an open cavity with positive sputum. In some cases the cavity had remained open in spite of an apparently adequate collapse by pneumothorax; in others pneumothorax was impossible because of pleural adhesions. Several completely collapsed lower lobes continued to be the source of positive sputum despite the fact that no cavity could be demonstrated by ordinary X-ray films or laminograms. A middle lobe was excised because of a stenosis of its bronchus. In only one case was the removal of an upper lobe undertaken deliberately (in a seventeen year old girl) when thoracoplasty would have been ordinarily the procedure of choice. In this group there were 13 excellent results (76.5 per cent), one with persistent positive sputum from bronchial stump ulceration and 3 deaths (17.6 per cent). The commonest indication for total pneumonectomy has been stenosis of the bronchus. Of the 10 patients with stenosis, 7 made an uncomplicated recovery. Of the whole group, 8 are well or working (53.3 per cent); 3 died (one of embolism, one of infection and one of contralateral reactivation), but 2 others have empyema and lung disease; the last 2 have positive sputum (from the opposite bronchus and stump ulceration). What would appear from a radiological standpoint a perfectly simple procedure may prove exceedingly difficult because of extensive adhesions, chiefly between diseased and adjacent lobes and or incomplete development of interlobar fissures. Lobectomies for cavities in close proximity to the interlobar fissures are likely to be difficult or even impossible. Neither partial nor total pneumonectomy should be undertaken while the bronchoscopic appearance still suggests the presence of an active tuberculous bronchitis at or near the site at which the bronchus will have to be divided. If a collapse of the apex of a lung be considered necessary in a patient who may subsequently require a pneumonectomy, an extrapleural pneumothorax is the procedure of choice rather than a thoracoplasty. The author closed the bronchus with a running suture of chromic catgut on an atraumatic needle, sometimes reinforced by a few interrupted stitches of fine silk.—*Total and Partial Pneumonectomy in the Treatment of Pulmonary Tuberculosis, R. M. Janes, J. Thoracic Surg., February, 1945, 14: 3.*—(*W. M. G. Jones*)

Pulmonary Resection for Tuberculosis.—These cases represent all resections for tuberculosis done between 1934 and July, 1943. Those done before January 1, 1942 (18) are reported separately as the modern technique had not been worked out before. The 45 operations done since January 1, 1942 represent those done by hilar dissection and the pleural flap method of closing the bronchus. Division into "desperate risk" and "reasonable risk" groups is made. Thirty-five of the cases were pneumonectomies and 28 lobec-

tomies. Twenty-three patients (37 per cent) had endobronchial tuberculosis. Fifty-one of the 61 cases reported were women (2 cases had bilateral resection). Only 6 had negative sputum. The indications for resection are as follows: (*1*) for associated suppurative disease, 10 cases; (*2*) post-thoracoplasty, uncontrolled disease, 11 cases; (*3*) extensive multilobar, unilateral tuberculosis, 27 cases (most of these patients had very extensive and active tuberculosis, all treated by pneumonectomy); (*4*) upper lobe cases, resection elected in preference to thoracoplasty, 5 cases; (*5*) basal tuberculosis, 7 cases; (*6*) miscellaneous groups, one case each: recurrent hemoptysis following thoracoplasty, tension cavity, and a tuberculoma. The all-too-common complications of persistent fistula and tuberculous empyema were almost eliminated entirely from the second group of 45 cases; there was only one fistula and no case of tuberculous empyema. Contralateral spread appeared in 5 cases in this group (11.1 per cent). The only other serious complication was tuberculous ulceration in the stump of the bronchus (also 11.1 per cent), which occurred at the site of the mattress sutures. These sutures are now omitted and a simple end closure with silk is used. Routine post-operative bronchoscopy is strongly urged at interval of six weeks and six months. Five of the 45 cases died (11.1 per cent). The mortality for reasonable risks was 5.5 per cent, and for desperate risk cases 33.3 per cent. There were also 5 late deaths, but only 2 of these patients died of tuberculosis. Follow-up of the entire series (May, 1943) showed 15 of the 61 patients have died; of the remaining 46, 34 are clinically well and 26 are working. Of these 46, 13 have positive sputa on smear or concentrate. Resection is believed to be the treatment of choice: (*1*) in preference to thoracoplasty in cases with active parenchymal disease complicated by bronchial stenosis; (*2*) in extensive basal tuberculosis with or without associated bronchiectasis; (*3*) in unilobar disease that has failed to respond to pneumothorax with apparently adequate collapse; (*4*) in unilateral disease that has failed to respond to an adequate thoracoplasty; (*5*) in preference to cavernostomy in the treatment of tension cavities in unilobar or extensive unilateral disease; (*6*) in extensive unilobar disease with dense opacities and little evidence of fibrosis and retraction; (*7*) in progressive unilobar or unilateral tuberculosis in the teen-age group; (*8*) for tuberculoma. Thoracoplasty before resection of the lung is considered contraindicated and unnecessary. The danger of contralateral spread can be reduced by careful suction of all secretions as they collect and by placing a temporary ligature around the bronchus early in the dissection whenever possible. Pulmonary resection can be performed safely in the presence of an extending active lesion, and complications have not been encountered in these cases more often than in the inactive group. Tuberculous bronchitis, either active or inactive, is not within itself a contraindication to resection, even if it has to be traversed during the procedure. To be a contraindication to resection, the contralateral lesion must be either uncontrolled or uncontrollable. Pneumothorax is permissible on the contralateral side in lobectomy, but not in pneumonectomy. Only 2 of the living patients have progressive contralateral disease, showing that the vast majority of cases handled the contralateral lesion without difficulty. The extent of resection cannot always be definitely determined prior to exploration as considerable disease may be found in a lobe where it was not suspected by X-ray studies.—*Pulmonary Resection in the Treatment of Tuberculosis, R. H. Overholt & N. J. Wilson, J. Thoracic Surg., February, 1945, 14: 55.*—(*W. M. G. Jones*)

Pulmonary Resection for Tuberculosis.—The indications for lobectomy are: (*1*) tension cavities which failed to respond to pneumothorax or where pneumothorax was not advisable; (*2*) predominantly bronchial type of tuberculosis, perhaps with little cavitation; (*3*) lower lobe cavity not responding to pneumothorax; (*4*) extensive caseation of one

lobe with little cavitation and with disease almost limited to the one lobe; (5) a shrunken destroyed lobe with extensive cavitation with contralateral lung normal or contralateral lung requiring perhaps later collapse therapy; (6) unilobar disease in a young patient in preference to thoracoplasty, especially if still in the growing age period. Lobectomy conserves more pulmonary function than does thoracoplasty. The degree of tuberculous activity permissible in this group is a question, and some of these patients had elevated sedimentation rate, slight fever and an elevated pulse rate. Others had had extensive bilateral disease one or two years prior to operation. The only patient who died from contralateral spread in this series had a large amount of sputum. Cases presenting on the operation table an unsuspected involvement of the apex of the lower lobe or those in which the fissure is incomplete or fused were usually not given lobectomy and some other procedure substituted. (A lateral tomograph is of some help in depicting interlobar fissures before operation when other means fail.) Oxygen-ether is preferred as it gives a smooth anesthesia. Silk was used throughout; and the bronchial stump always covered by a flap of pleura. The phrenic nerve was crushed following removal of a non-contracted upper lobe. The remaining lobe is freed of all adhesions to permit full expansion. All cases were drained by water-seal method for forty-eight hours. Duration of operation averaged four and one-half hours. No instance of shock was encountered, due to avoidance of anoxia, meticulous technique and adequate intravenous therapy. Bronchoscopy was not performed routinely after operation, but great care was used to avoid retention of bronchial secretions. Results: of 15 living patients, 13 are in good condition, 12 have negative sputum and 6 of these by culture. One had a small apical staphylococcus empyema cured later by a thoracoplasty. One case developed a tuberculous empyema and bronchial fistula which will require a thoracoplasty.—*Lobectomy for Pulmonary Tuberculosis, H. C. Maier & R. Klopstock, J. Thoracic Surg., February, 1945, 14: 20.*—(*W. M. G. Jones*)

Massive Blood Transfusions after Lung Resection and Pulmonary Edema.—Experiments on dogs show that massive whole blood transfusions following extensive lung resections are well tolerated if certain precautions are observed: if the amount of lung resection, the rate of infusion and the amount of infusion are kept within limits simulating clinical practice. Every cubic centimeter of blood lost during operation should be replaced by whole blood and there should be no delay in the replacement. Shock due to hemorrhage is more easily prevented than treated. When patients are given very large amounts of blood in a short period of time very little saline or glucose should be given in the following twenty-four hour period. As the average blood loss in lung resection is about 1,500 cc., three to five blood transfusions as replacement are in order, and pulmonary edema probably will not occur except in the presence of severe cardiovascular or pulmonary disease. (Even if all this blood is given rapidly citrate poisoning is unlikely as 2,500 cc. would have to be given in fifteen minutes to approach the fatal dose of sodium citrate in animals. If necessary, fatal toxic reaction from the citrate can be avoided by intravenous injection of calcium salts.) If a patient sustains a severe hemorrhage and whole blood is not immediately available, saline, glucose and plasma must be used to combat shock; but whole blood for replacement is necessary, only one must in these circumstances necessarily limit the volume of whole blood given to avoid the danger of pulmonary edema.—*The Use of Whole Blood Transfusion in Resections of the Lung, T. F. Thornton, W. E. Adams, J. E. Bryant & L. M. Carlton, J. Thoracic Surg., April, 1945, 14: 176.*—(*W. M. G. Jones*)

A Self-Retaining Scapula Retractor.—"By shortening one blade of the Tuffier retractor and inserting pegs along the outer surface of the second (sliding) blade, this retractor

can be used as a self-retaining scapula retractor. No assistant is required to hold it, and there is no danger of perforating the parietal pleura during thoracoplasty. The exposure secured is excellent and the retractor will work well for either side of the chest."—*Self-Retaining Scapula Retractor for Thoracoplasty, K. P. Klassen, J. Thoracic Surg., October, 1945, 14: 414.*—(*W. M. G. Jones*)

Tuberculosis of Nasopharynx.—Tuberculosis of the nasopharynx occurred in 18 of 24 cases of pulmonary tuberculosis studied at autopsy. The pathological process was generally an ulcerative lesion on the posterior portion of the roof and the upper portion of the posterior wall. Less frequently lesions were found on the posterior margin of the ostia of the Eustachian tubes and nasopharyngeal surfaces of the uvula and soft palate. In 4 of the 18 cases lesions were found only microscopically. Graf noted gross lesions in 36 per cent of 118 cases of pulmonary tuberculosis, while microscopically the incidence was 82 per cent. No nasopharyngeal tuberculosis was found either by gross or microscopic examination in the authors' cases of miliary tuberculosis. They agree with Dietrich that hematogenous infection is rare. The important etiological factor is the inoculation of the nasopharyngeal mucous membrane by the bacilli from the sputum. This explains the localization. The deep inferior cervical lymph nodes were involved, but not the superior cervical retropharyngeal nodes. Gross ulcers were irregular, ovoid, with undermined margins and yellowish-gray bases. Histopathological changes were observed primarily in the remnants of the lymphatic tissue and consisted of subepithelial tubercles with varying degrees of caseation. Clinically, tuberculosis of the nasopharynx may remain as the active source of reinfection after the arrest of the pulmonary process. Therefore, where sputum conversion does not occur, the nasopharynx should be investigated as a possible focus.—*Tuberculosis of the Nasopharynx: Its Frequent Incidence and Clinical Significance, A. R. Hollender & P. Szanto, Dis. of Chest, May–June, 1945, 11: 227.*—(*K. R. Boucot*)

Tuberculosis of Brain.—Twenty-two cases of cerebral tuberculosis have been studied. They can be divided in asymptomatic (silent) and symptomatic forms. Five different types may be distinguished: (*1*) the tumorous type: symptoms depend upon the location of the lesion and include increased spinal pressure; (*2*) the encephalitic type which is really a tuberculous meningoencephalitis; (*3*) multiple tuberculomata; (*4*) meningeal types which are very hard to differentiate from tuberculous meningitis; (*5*) mixed types. In 15 cases an autopsy was performed. In all of them pulmonary tuberculosis was encountered which was active in 11 and inactive in 4. In all cases below fourteen years of age an active pulmonary lesion was found. Amongst the 4 inactive cases 2 presented the tumorous form of cerebral tuberculosis. In the brain, the lesions showed inflammatory reaction and fibro-caseous destruction. This is the most frequent finding and seems to be the common reaction of the nervous tissue to the Koch bacilli. The size of these lesions varies from pin-head to walnut. It has not been possible to verify if the meningeal infection or the encephalitic infection was first to start. One case of early cerebral tuberculosis has puzzled the author. The patient had succumbed to caseous-pneumonic tuberculosis and had shown no clinical symptom of cerebral involvement. The autopsy showed a fibro-caseous nodule of the size of a rice kernel in the inferior portion of the anterior orbital gyrus. This nodule showed a necrotic focus with many histiocytes and lymphocytes. There was thrombosis of the capillaries within the nodule and also in the surrounding tissue and numerous Koch bacilli were found. The author believes that possibly some cases of acute exacerbation of cerebral tuberculosis which are superimposed on preëxisting tuberculoma, may benefit from a treatment with Jousset allergen which caused some sensation at the time of its first publication in 1932. Revision and thorough study of this treat-

ment is advocated.—*Aspectos anatomo-clinicos de la tuberculosis cerebral, J. Bernales, Rev. méd. peruana, May, 1945, 18: 145.*—(*W. Swienty*)

Arthrodesis of Hip.—Thirty-two patients with unilateral tuberculous involvement of the hip were operated upon in the hope of producing fusion of the unstable joint. The patients varied in age, duration of disease, amount of incapacity and amount of joint destruction. Four types of surgical techniques were used: (*1*) the standard Hibbs procedure with transplantation of the greater trochanter of the femur across the joint line after reversal of its direction; (*2*) massive transplant of the anterior portion of the crest of the ilium across the joint line; (*3*) use of chips of various sizes after curettage; (*4*) simple curettage of the joint. Union of the joint was achieved in 80 per cent of the Hibbs type graft, 70 per cent following massive inlay graft, 50 per cent following chip graft and no union in the one acute case in whom only curettage was performed. Although the percentage of successes resulting from the Hibbs and massive inlay grafts was nearly the same, the former procedure secured synostosis in an average of twelve months, whereas the latter averaged eighteen months. The distribution of cases in these two groups regarding the amount of destruction present according to preoperative X-ray evidence was essentially equal.—*Experiences with Arthrodesis for Tuberculosis of the Hip, D. M. Bosworth & L. A. Green, Quart. Bull. Sea View Hosp., January, 1946, 8: 39.*—(*P. Q. Edwards*)

Skin Tuberculosis.—Presumptive evidence of a primary tuberculous complex of the skin consists of histological and bacteriological proof of the tuberculous nature of the lesions and evidence that it is a primary infection. This latter criterion is often difficult to substantiate. Two cases are presented, both of which fulfill the above stipulations: a small, isolated tuberculous lesion of the skin with enlargement of the regional lymph nodes and formation of a cold abscess. The superficial lesions as well as the adenitis were proved to be tuberculous by both culture and biopsy. In the second case there was a concomitant primary tuberculous complex in the lungs. Complete surgical removal of the skin focus and adjacent infected nodes does not result in any untoward results, such as a persistent draining sinus, and may be of value as a prophylactic measure against possible future dissemination to other parts of the body.—*Primary Tuberculosis of the Skin: Case Reports, M. Weichsel & P. F. Salgado, Quart. Bull. Sea View Hosp., January, 1946, 8: 62.*—(*P. Q. Edwards*)

Artifacts in Preparations of Tubercle Bacilli.—Artifacts may arise from the mechanical manipulation of tubercle bacilli while they are being spread on a slide and from the staining procedure. An attempt was made to establish the real or artifact nature of beads and granular forms in tubercle bacilli. Much granules can be demonstrated in tubercle bacilli of various ages and morphology as derived from four-day old, one-month old and eight-month old cultures. Comparisons were made between preparation stained with methylene blue (Loeffler's on unfixed cells), a 1 per cent water solution of basic fuchsin, or Giemsa stain after acid hydrolysis (method used by Robinow, 1941). The latter revealed a granular component reasonably referred to as a nuclear body, which could be easily confused with the bodies described by Much. Upon closer comparison, however, dissimilarities are readily noted. In young cells the nuclear bodies generally number two, sometimes three, whereas the Much granules are usually larger and appear in varying numbers, often as many as six or eight. The latter granules are rather evenly distributed along the cell, whereas the nuclear bodies are located most frequently at the ends and not at nearly equal intervals. Similar differences were observed in cells from older cultures. No formed bodies within the bacillus corresponding to the granules of Much were seen in stained or unstained living prepara-

tions. The appearance of the Much granules is neither dependent on nor indicative of the presence of ether-alcohol soluble components. Extracted cells show them as well as unextracted. Tubercle bacilli that have been fragmented or otherwise rendered non-acid-fast no longer have the capacity to show Much granules. This is a rather unique characteristic, since, as a rule, formed structures of fixed cells stain whether the cell is intact or not. The granules decrease in number and size instead of density as the concentration of the stain is reduced; this would not have been the case if they represented structural components of the cell. These granules are not peculiar to mycobacteria; they can be demonstrated in acid-fast cells of a distinctly different origin. Treatment of Much-stained granular bacilli with 5 per cent phenol results in a dispersal of the stain throughout the cell body and if these solidly stained cells are again washed in sequence with Lugol's iodine, nitric acid and the remaining solutions of the staining technique, some of the bacilli become granular again. They may be fewer in number and may be in new locations relative to the whole cell. Ultimately the cell seems to give up its stain so that no or only a small number of granules appear. It is extremely unlikely that the formed structures of a fixed cell could behave in such a fashion, especially in shifting position. The beaded tubercle bacillus is another conspicuous structural variant of the uniform acid-fast rods. It appears only in carbol-fuchsin stained preparations and here not consistently. The chemical composition of the fuchsin, the concentration of the dye, and the presence of dilute sodium chloride in the dye, all influence the number of beads formed. In addition it has been shown that 95 per cent alcohol will dissolve or disperse these bodies. To obtain at will a high concentration of beaded cells in any preparation it is simply necessary to add to the regular carbol fuchsin solution 0.5 g. of sodium chloride per 100 ml. In this study it has not been possible to identify beads with any of the granular variants or inclusions of the tubercle bacillus that are more definitely established as real and functional forms or components of this microörganism. The granules of Much and beads are similar in character and neither one represents a morphological unit of the tubercle bacillus. It is not possible to explain the origin of beads and granules. That they can be readily created in the actively multiplying cells from young cultures suggests that they are not dependent upon degeneration products for their appearance. They may represent small dense concentrations of dye developed from some reaction between solvents and stain. The *Mycobacterium tuberculosis* does apparently not have a great variety of viable forms connected with its reproduction. Unquestioned is the acid-fast rod, which may show branching and which, after appropriate staining, shows what seem to be nuclear bodies. Of this form, newly developed cells may be weakly acid-fast and take the counterstain. It seems likely that Much's granules and beads are of similar origin and are both artifacts of the staining procedure.—*Some Artifacts Encountered in Stained Preparations of Tubercle Bacilli: II. Much Granules and Beads, K. R. Porter & D. Yegian, J. Bact., November, 1945, 50: 563.*—(*F. G. Petrik*)

Fluorescent Method for Detecting Tubercle Bacilli.—A method is presented for preparing and staining smears for the fluorescent method involving the use of a blending agent, methyl cellulose, with or without prior enzyme treatment of the sputum. The blending agent tends to separate the bacilli from the artifacts and make their recognition easy. The quality of the slides seems to be improved by treating the sputum with a water solution of pancreatic enzymes. The addition of dried bile to the enzyme solution may also be helpful in reducing artifacts. The enzyme may act to reduce artifacts because the latter are fatty substances that react with lipase, or the enzyme may alter the structure of the sputum so that better blending results. Good slides can be prepared without the enzyme

treatment and users may decide to simplify the method by its omission.—*Improvements in the Fluorescent Method for Detecting Tubercle Bacilli, D. S. Stevens, J. Lab. & Clin. Med., October, 1945, 30: 892.*—(*F. G. Petrik*)

Peculiar Corpuscles in Tuberculous Material.—The author describes, with the aid of illustrations, sparsely occurring bodies found from time to time in the examination of tuberculous sputum. These cone-like bodies are felt to be fungi of the yeast-oidia group. They occur in association with tubercle bacilli. In several instances, mycelia-like elongations were noted protruding from the mother cell. Large stratified cells similar to those reported from tissue of Schaumann's disease were noted. The association and significance of these findings are not known.—*On Peculiar Corpuscles Occurring in Tuberculous Material, V. Hallberg, Acta med. Scandinav., April 8, 1943, 113: 412.*—(*E. R. Loftus*)

Egg Powder for Media.—Dried egg powder is becoming available in Europe. It is, therefore, recommended for the preparation of media for the cultivation of tubercle bacilli: 120 ml. fresh milk, 5 g. potato flour, one small potato are heated in the boiling water bath, for one hour. After cooling to 60° C. the following mixture is added: 60 to 70 g. dried egg powder, 10 ml. glycerol, 5 ml. of a 2 per cent aqueous solution of malachite green, 1.5 to 2 g. asparagin and enough water to make up to 200 ml. The medium is tubed and sterilized in the usual manner.—*Kultivácia Mycob. tuberculosis na pôde z prášku zo sušených vajec, I. Friedmann, Časopis Lekařů Českých, April 19, 1946, 85: 516.*—(*O. Felsenfeld*)

Weltmann Reaction.—The Weltmann reaction is influenced by the pH of the medium. Because of the disagreement of several authors regarding the importance of the calcium level for the reaction, 10 patients received high doses of calcium intravenously and the blood calcium level as well as the Weltmann reaction before and after the injections were tested. While a considerable increase of the blood calcium was observed, the Weltmann reaction was unaltered or showed a slight shift to the right. It is concluded that other points also play a rôle in the establishment of the reaction.—*Pokus o výklad Weltmannovy reakce, M. Skyba, Lékařské Listy, February, 1946, 1: 45.*—(*O. Felsenfeld*)

Bacteriostasis of Oils for Tubercle Bacillus.—(*1*) The bacteriostatic action of peanut oil, cod-liver oil and gomenol for the H37 strain and the bovine and avian types was determined. (a) Peanut oil is inhibitory for virulent human strains in a concentration of 5 per cent; for the bovine type in a concentration of 2 per cent; for the avian type the limit of tolerance was not determined, but it is greater than a concentration of 10 per cent. (b) Cod-liver oil is bacteriostatic for the human, bovine and avian types in 1 per cent concentration. (c) Gomenol is bacteriostatic for both human and avian types in 5 per cent concentrations. Complete inhibition of the bovine type occurred in 1 per cent concentration. (*2*) Prolonged incubation of virulent human strains with peanut oil, cod-liver oil and gomenol does not alter the virulence or the acid-fastness of the organisms, although the colony morphology is altered. (*3*) Complete lysis of colonies by oil was not observed. (*4*) After exposure of the human and bovine strains to the inhibiting effect of oils, a rich medium is required for growth. (*5*) It is suggested that the oils adherent to the tubercle bacilli inhibit the growth of this bacillus by a physical rather than a chemical action.—*Studies in Oleothorax: I. The Bacteriostatic Action of Oils on the Tubercle Bacillus, P. D. Crimm & Veronica F. Martos, J. Thoracic Surg., August, 1945. 14: 265.*—(*W. M. G. Jones*)

Sulfadiazine in Experimental Tuberculosis.—Twenty-four guinea pigs were inoculated with tubercle bacilli. Six animals were not treated; 6 received from the day of the inocula-

tion 300 mg. sulfadiazine daily (group A); in 6 animals the same treatment was started one week after inoculation (group B); in 6 animals it was begun three weeks after the inoculation (group C). The dose of sulfadiazine was later diminished because of its toxic effects. One animal of each group was sacrificed after fifteen days, one, one and a half, two and three months; no animal in any group lived longer. In group A a favorable action of the drug on the bacillemia and inhibition of propagation to the organs for some weeks was seen; the effect was less favorable in group B; group C showed rather an acceleration of caseation.—*Sulfadiazine et tuberculose expérimentale du cobaye, M. Giroux, Laval méd., January, 1946, 11: 24.*—(*G. C. Leiner*)

Streptothricin and Streptomycin in Experimental Tuberculosis.—The tuberculostatic activity of streptothricin and streptomycin upon the human tubercle bacillus was studied *in vitro* in Kirchner's medium. Streptomycin was found to be approximately 20 times more active against the tubercle bacillus than streptothricin. The toxicity of the two drugs for the developing chick embryo was tested in various concentrations. Streptothricin was approximately four times more toxic than streptomycin. The inhibitory effect of streptomycin on the development of tubercles in the chorioallantoic membrane of the chick embryo following incubation of bacilli with the drug at 37.5° C. for twenty-four and forty-eight hours has been established.—*The Tuberculostatic Action of Streptothricin and Streptomycin with Special Reference to the Action of Streptomycin on the Chorioallantoic Membrane of the Chick Embryo, E. W. Emmart, Pub. Health Rep., November 30, 1945, 60: 1415.*—(*G. C. Leiner*)

Inhibition of Tubercle Bacillus by Aspergillic Acid.—The inhibitory action of aspergillic acid on two strains of *M. tuberculosis*, H37 and a fast-growing human type, was investigated. The media used were Long's synthetic medium, with and without ferric ammonium citrate and bacto-nutrient broth. On the latter medium, only the fast-growing tubercle bacilli multiplied readily. Liquid media were used for the fast-growing strain: agar was added for growing the H37 strain. Aspergillic acid was added to the media as the sodium salt. Aspergillic acid in low concentrations (1:80,000) inhibits the growth of *M. tuberculosis* in media to which no ferric ions were added. Ferric ions are precipitated by aspergillic acid. It seems likely that iron is essential for the growth of *M. tuberculosis*; aspergillic acid inhibits the growth by interfering with the utilization of iron of perhaps also by interfering with the functioning of iron-containing enzyme systems.—*The Antitubercular Activity of Aspergillic Acid and Its Probable Mdoe of Action, A. Goth, J. Lab. & Clin., Med. November, 1945, 30: 899.*—(*F. G. Petrik*)

Reactivation of Tuberculin Reaction.—Eight cases are reported of spontaneous activation at the site of a previously negative tuberculin test. This activation coincided with a primary infection which had occurred some time following the negative skin reaction. At the time at which the phenomenon of spontaneous activation occurred newly performed tuberculin tests were positive. The cases were observed among student nurses exposed to tuberculosis. The interval between performance of the tuberculin reaction and the appearance of spontaneous activation was 119, 84, 55, 24 and 15 days, respectively. The last 2 cases were considered as belonging to a somewhat different category since the tuberculin reaction possibly may have been performed within the pre-allergic phase and after the primary infection had already taken place. In 2 cases the primary infection remained clinically silent. In all other cases more or less severe symptoms were present during this period: chest pain, joint pain, loss of weight, episodes of fever. One case presented fever with development of erythema nodosum and fatal tuberculous meningitis shortly thereafter. In 4 cases X-ray examination revealed foci in the parahilar region.—*Nouveaux*

cas de virage spontané de la cuti-réaction a la tuberculine, E. Rist & Ch. Coury, Rev. de la tuberc., 1944–1945, No. 7-9, 9: 109.—(V. Leites)

Vitamin C in Tuberculosis.—Sixty persons, of whom 10 were normal and 50 ill with tuberculosis, were examined as to blood vitamin-C level and urinary excretion of the vitamin. The method of van Eekelen, Emmerie and Wolff was used for the determination of ascorbic acid, a method which includes the oxidized reversible acid as well as the reduced. Saturation was determined by intravenous injection of 300 mg. vitamin C and analysis of the content in the urine for the following three hours. Saturation existed when more than one-half was excreted. In group one, which consisted of 21 normals, healed or inactive patients, the blood values varied between 0.7 and 2.9 mg. per cent, with the average at 2.0 mg. per cent. Group two, consisting of 26 patients with productive tuberculosis, had values of blood vitamin C ranging from 0.5 to 3.0 mg. per cent, with an average of 1.85 mg. per cent. Group three, with 13 patients with exudative tuberculosis, had values from 1.0 to 3.0 mg. per cent and an average of 2.05 mg. per cent. There was no relation between the severity of the disease and the blood level of ascorbic acid. There was, however, a direct relation between the disease severity and the unsaturation, as determined by the amount of ascorbic acid needed to be injected to bring the urinary excretion up to normal. There was no relation between the blood value and the urinary deficit, except that saturation was reached more easily with high blood vitamin-C levels. Part of the discrepancy may be explained by the prevention of further oxidation of dehydroascorbic acid in those most ill, resulting in high blood values of the reversible oxidized acid. In the urine only the reduced acid appears, giving a truer picture. Determination of urinary excretion of injected ascorbic acid is thus the best method of studying vitamin C metabolism.— *Untersuchungen über den Vitamin C-Gehalt des Blutes bei Lungentuberkulösen, J. E. Wolf, Schweiz. med. Wchnschr., June 9, 1945, 75: 506.—(J. Gerstein)*

Lung Volume and Ventilation.—A method was worked out which permitted the measurement of the following pulmonary data: (*1*) residual capacity (usually termed residual air), that is, the amount of air left in the lungs after a complete expiration; (*2*) equilibrium capacity (usually called mid-capacity), that is, the amount of air left in the lungs after a normal expiration; (*3*) total capacity, that is, vital capacity plus residual capacity. Normal values for the residual, equilibrium and total capacity and the ratios $\frac{\text{Equilibrium capacity}}{\text{Total capacity}}$ and $\frac{\text{Residual capacity}}{\text{Total capacity}}$ were determined for 35 healthy persons, 16 males and 19 females. The upper normal value for the relation of the residual capacity to the total capacity was for males 30.2 per cent, for females 33.9 per cent. In cases of slight tuberculosis the values were the same as in normals. In cases of extensive tuberculosis the total capacity diminished considerably, the equilibrium capacity did not show any definite change, the residual capacity showed a definite rise. The cause of the increased residual capacity and the relatively increased equilibrium capacity was probably pulmonary emphysema or any air spaces in the lungs that were functionally inferior such as cavities. Similar findings were obtained in bronchial stenosis. Under pneumothorax treatment a decrease of all the values was seen, but the relation between the various data remained the same. A change of these ratios was found when there was one of the conditions present which produced the same effect in the cases of pulmonary tuberculosis without pneumothorax treatment. Thoracoplasty reduced the absolute values of total capacity, equilibrium capacity and residual capacity; the residual capacity showed a relative rise. In patients who had had thoracoplasties six to sixteen years prior to the examination, the lung volume was increased, apparently due to distention of the contralateral lung, but the rela-

tions between the volume fractions were the same as in recently operated cases. In 14 cases the lung volume was determined before and one to two months after pneumonectomy or lobectomy. The remaining lung tissue increased in volume and a rise in the ratios $\frac{\text{Residual capacity}}{\text{Total capacity}}$ and $\frac{\text{Equilibrium capacity}}{\text{Total capacity}}$ took place. In cases examined some years after operation these increased values seemed to have diminished in connection with an increase of the total capacity. During the air insufflation in pneumothorax treatment expansion of the thoracic cage takes place. The physiological dead space is that part of the inspired air that is left behind in the air passages and thus does not reach the alveoli. A new method was devised to determine the dead space. With this method, uneven ventilation has an enlarging effect on the dead space. The value obtained for the dead space gives a fairly good idea of the effectiveness of ventilation. The dead space was in 8 normal males between 0.13 and 0.26 liters, in 4 normal females between 0.09 and 0.14 liters. In 10 out of 12 cases of emphysema a dead space of more than 0.26 liters was found. In cases of bronchostenosis there was an absolute and relative increase in the dead space. In cases of far advanced pulmonary tuberculosis without collapse therapy an enlarged dead space was usually found. In pneumothorax no important change of the ventilation efficiency in respect to dead space and uneven ventilation was found. Thoracoplasty did not, as a rule, lead to marked differences in the efficiency of ventilation. After some time a slight impairment of the ventilation might arise due to "complemental emphysema." After lobectomy and pneumonectomy the efficiency of ventilation was reduced, probably due to distention of the lungs. There is probably a reflex mechanism by which diminution of the lung volume produces an increase of the thoracic volume; this then is the cause of a permanent distension of the lungs. This reflex possibly serves to maintain a respiratory surface of a certain size and to facilitate the blood flow through the lungs. In general, a relative increase of the equilibrium and residual capacities was associated with dyspnea. The presence of the same vital capacity in individuals of the same size does not imply that their lungs have the same functional capacity. This is, however, more probable if the residual capacities are equal.—*Lung Volume and Ventilation Efficiency: Changes in Collapse-treated and Non-collapse-treated Pulmonary Tuberculosis and in Pulmonectomy and Lobectomy, G. Birath, Acta med. Scandinav., Supplementum 154, 1944.*—(*G. C. Leiner*)

Positive Pressure Respiration.—Experimental studies were carried out on dogs anesthetized with pentobarbital sodium to determine the effect of long periods of pressure breathing alone and when combined with acute hemorrhage or trauma of the hind limbs. The following results were obtained: (*1*) Continuous positive pressure respiration with a pressure of 20 cm. of water. *a*) Five of 9 animals survived three hours of continuous positive pressure respiration, but the other 4 developed fatal apnea. *b*) The apnea caused by a continuous positive respiratory pressure of 20 cm. of water was not affected by large doses of atropine but was abolished by bilateral vagotomy. *c*) Continuous positive pressure respiration had a variable effect on the femoral arterial pressure and on the heart rate. It slowed and deepened the respirations. It elevated the jugular venous pressure, the renal venous pressure, the pulmonary arterial pressure and the pulmonary venous pressure. It decreased the diameter of the heart and thoracic inferior vena cava but increased the diameter of the abdominal vena cava. It dilated the tracheobronchial tree. *d*) Three of 8 animals survived two hours of continuous positive pressure respiration after a hemorrhage of 30 cc. per kilogram of body weight in five minutes, but the other 5 animals developed either apnea or circulatory failure. *e*) Three hours of continuous positive pressure respiration did not cause either pneumothorax or mediastinal emphysema in a single case, but in all of a group of 5 animals acute parenchymal and subpleural emphysema developed. (*2*)

Intermittent positive pressure respiration with a pressure of 20 cm. of water. *a*) All of a group of 5 animals withstood three hours of intermittent pressure respiration without difficulty. *b*) Intermittent positive pressure respiration produced considerable fluctuation of the femoral arterial pressure with a decrease of the mean pressure. It elevated the jugular venous pressure, the pulmonary venous pressure, the renal venous pressure, and the pulmonary arterial pressure. It decreased the diameter of the heart and thoracic inferior vena cava but increased the diameter of the abdominal vena cave and the tracheobronchial tree. It slowed and deepened the respirations but had no consistent effect on the heart rate. *c*) Three of 5 animals survived, without difficulty, two and a half hours of intermittent positive pressure respiration following a hemorrhage of 30 cc. per kilogram of body weight in five minutes. The other 2 developed circulatory failure and the animals were given 10 cc. of blood per kilogram of body weight with such improvement that they were then able to complete the experiment. *d*) Splenectomized animals were unable to withstand even a small hemorrhage (10 to 20 cc. per kilogram of body weight) during intermittent positive pressure respiration. *e*) Trauma to the hind limbs during intermittent positive pressure respiration proved fatal to all 4 animals. It was demonstrated that the pressure breathing was a definite factor in hastening their death. *f*) Three hours of intermittent positive pressure respiration with a pressure of 15 cm. of water did not cause either pneumothorax or mediastinal emphysema in a single case, but in all of a group of 3 animals acute parenchymal and subpleural emphysema developed. (From the authors' Summary)—*Certain Effects of Positive Pressure Respiration on the Circulatory and Respiratory Systems, D. T. Carr & H. E. Essex, Am. Heart J., January, 1946, 31: 53.*—(*G. C. Leiner*)

Intrapleural Gases.—Textbooks generally agree that the diffusion of gases in the pleural cavity is dependent upon the partial pressure differential between the gases in the pleural space and those in the venous circulation, thereby providing a *modus operandi* for the moving of the gases into the venous circulation. The pleura itself also plays a vital rôle in modifying the diffusion of gases. The mechanism of pleural absorption was demonstrated experimentally by a study of the gases in the pleural cavities of 44 patients with uncomplicated unilateral pneumothoraces: 50 cc. of air was withdrawn from the pleural cavity for direct analysis of oxygen and carbon dioxide content by the Haldane-Boothby-Sandiford method. Nitrogen content was the amount left after subtracting the other two. Volumes per cent of the respective gases were calculated by the Coryllos formula. In 145 analyses on 44 patients, the oxygen volume percentages in the pleural space were much below the level of oxygen in the venous system: average volume percentages were 2.8 or 19.96 mm. Hg. in the pleural cavity, whereas those in venous blood are reported as 5 or 38 mm. Hg. High concentrations of oxygen were then used to wash out the pleural space. The oxygen per cent was determined within seventy-two hours and found to be at the original level, far below the level in the venous blood. Hence, oxygen volume percentages in the pleural cavity are obviously not in equilibrium with the venous system, except during the first twenty-four hours after refills. Nitrogen is an inert gas, taking no part in metabolic processes and should theoretically be in equilibrium with the partial pressure of the tissues and venous system. The experimental data showed that the nitrogen partial pressure is above that in the tissues and venous system, probably because of the pressure of the expanding lung on the enclosed pleural gas, as well as the atmospheric pressure exerted on the pleural gases through the soft tissues of the chest wall. The consistently higher carbon dioxide content in the pleural space, which was found to be remarkably constant for a given individual, adds further indications that the pleural gases achieve equilibrium with the pleural tissues rather than the venous circulation. A constant relationship between oxygen and carbon dioxide volume percentages and

partial pressures, varying in inverse proportion, apparently represent a dependence of the amount of these gases upon the state of the oxidation process in the pleural tissues, that is, the visceral pleural tissue layers above the areolar layer. Only through such reasoning can the high volume percentages of carbon dioxide and oxygen, which are consistently found in the pleural cavity, be satisfactorily explained.—*A Study of the Behavior of Gases in the Pleural Cavity in Artificial Pneumothorax Therapy for Pulmonary Tuberculosis, G. G. Ornstein, M. Herman & Marcella Friedman, Quart. Bull. Sea View Hosp., January, 1946, 8: 5.*—(*P. Q. Edwards*)

Intrapleural Gases in Bilateral Pneumothorax.—If the volumes per cent of oxygen carbon dioxide and nitrogen in the pleural cavity were dependent on the volumes per cent and partial pressures of these gases in the venous system, then the readings in both pleural cavities should be identical to those in the venous circulation. Other fundamental questions, such as (*1*) the effect of the degree of lung collapse on the gas percentages, (*2*) the influence of gases in one pleural space upon those in the other and (*3*) the volume of gas absorbed from both pleural cavities of the same individual, were also answered by investigating the behavior of gases simultaneously in two pleural cavities. Analyses of the gases in the pleural spaces of 3 patients with uncomplicated bilateral pneumothoraces were made. The belief that the pleural gases are in equilibrium with the venous circulation was disproved by the following data: (*1*) the pressure of oxygen in the pleural cavities ranged from 2.71 to 23.3 (average 9.0), whereas the oxygen in venous blood is around 40.0 mm. Hg., (*2*) carbon dioxide pressure was similar to venous carbon dioxide in one patient, but significantly higher in the pleural spaces of the other 2 patients, (*3*) there was a marked dissimilarity between the two pleural spaces in each of the 3 patients studied. That the degree of lung collapse does not cause stagnation of the blood in the pleural vessels and thereby account for the low partial pressures and volumes per cent of oxygen and the high levels of carbon dioxide in the pleural cavity (according to the textbooks), was adequately demonstrated by the results obtained in this study. No correlation was found between the partial pressures and the degree of lung collapse. The one logical explanation for this phenomenon is that the local metabolic processes in the pleural layers above the areolar layer in each pleural cavity determine the volumes per cent and partial pressures of the oxygen and carbon dioxide. Bilateral studies further revealed that there is no diffusion of gases from one pleural cavity to the other; each pleural cavity is entirely independent and unaffected by the volume per cent and the partial pressure of the gas in the opposite pleural cavity.—*The Behavior of Gases in Bilateral Pneumothoraces, M. Herman, G. G. Ornstein & Marcella Friedman, Quart. Bull. Sea View Hosp., January, 1946, 8: 28.*—(*P. Q. Edwards*)

Segments of Lung.—The interlobar fissures divide the lungs into five lobes, three on the right, and two on the left. The distribution of the bronchi and arrangements of the blood vessels in the five lobes make it desirable to consider the lungs in terms of eight major structural units. The lower lobes are made up of two parts, a superior or apical portion designated as the dorsal division, and an inferior portion designated as the basal division. The right middle lobe and the lingula have similar divisions. The dorsal divisions have special significance both surgically and pathologically because they are the most frequent sites of pulmonary abscesses. Pulmonary cysts are also frequently localized here. On the other hand, bronchiectasis is found in the basal divisions and often is bilobar occurring in the middle lobe and the basal divisions of the lower lobes. This constitutes one of the most attractive possibilities for partial lobectomy. Bronchiectasis and cystic disease are often sharply localized in various segments of the basal division of the lower lobes. Occasional instances occur when partial upper lobectomy will obviate the necessity for total pneumonectomy, as in bronchiectatic cases where there is

involvement of the lower and middle lobes and the antero-inferior segment of the upper lobe. The importance of precise preoperative localization of pulmonary disease with accurate appraisal of boundaries in terms of bronchopulmonary segments cannot be overemphasized. Roentgenograms, bronchography and bronchoscopy accomplish this. At the time of the operation, actual inspection and palpation of the lungs may aid in localization. If there is any question concerning the amount of tissue to be excised, the surgeon is obliged to err on the radical side. The excision of one or more of the minor pulmonary segments will have limited application and must be reserved for cases in which the lesion is peripheral and sharply localized. Neoplasms of the lung should not be treated by partial resection. The relative operative risks of partial and complete lobectomy are about the same. The author's experience is limited to 17 partial lobectomies with one death. During the same period, 55 complete lobectomies, about 50 per cent of which necessitated the removal of two lobes, resulted in one death. However, these figures are of no statistical value. The real importance of partial lobectomy lies in the possibility of conserving important amounts of lung tissue in selected cases.—*The Segments of the Lungs from the Standpoint of Surgical Procedures, B. Blades, Dis. of Chest, May–June, 1945, 11: 203.*—(*K. R. Boucot*)

Lobar and Segmental Collapse of Lung.—The early diagnosis of disease requires the combined efforts of the medical and surgical facilities. The thoracic surgeon has made such advances in recent years that X-ray methods must be constantly reviewed and improved, for accurate localization, as well as knowledge of the nature of the pathological process, clarifies both the indications for surgery and the surgical technique. X-ray demonstration of collapse of the lung and its subdivisions depends upon well executed technique. Procedures are therefore reviewed which have been of most value. In the majority of patients routine anterior-posterior, Potter-Bucky and lateral films furnish adequate information. The posterior-anterior film is the most valuable single part of the examination, but should be used primarily as a scout film. Pathological processes discovered should be fluoroscoped and a Potter-Bucky or Swedish grid and lateral film taken. In addition, oblique views, spot films and bronchography may be of value. Laminagraphy may give information not otherwise obtained. Fluoroscopy of all patients is an ideal not always attained and should be done to determine: (*1*) the dynamics of the chest, such as the extent and type of motion of the diaphragms, the position, size and type of pulsation of hilar shadows and mediastinal shift; and (*2*) the films necessary for best demonstration of the lesion. A relatively high kilovoltage is used at 4 ma. with the tube so located as to give 18 r per minute. During fluoroscopy spot films can be readily taken with the same kilovoltage at 50 ma. Findings should be recorded. A posterior-anterior film is needed in all cases for permanent record, but also to pick up minimal lesions that might be missed during fluoroscopy. Occasionally an X-ray film in full expiration may give more information than one at full inspiration. A lateral film should be taken in patients showing any abnormality in the posterior-anterior film or with a history of pulmonary disease. An anterior-posterior Bucky film permits further study of the bronchi and visualization of dense areas, fluid levels and bone detail. Eighty per cent of patients will need no further study to establish a diagnosis. If disease is bilateral, or if the study of the upper posterior part of the major fissures is desired, oblique views will often give more detail. Occasionally a posterior-anterior or anterior-posterior film taken in the lordotic position will reveal a lesion more clearly, such as collapse of the middle lobe. The necessity for such a film can be determined during the fluoroscopic examination. Laminagraphy has a definite place in the study of the bronchi, in separating normal from abnormal structures and for localizing a lesion. Most findings will have been evident before if X-ray methods are properly employed. As the patient re-

ceives a large dose of radiation it should not be done indiscriminately. Bronchography also gives valuable information when it is indicated, but it may also obscure progression or regression of a lesion. In bronchiectasis, it serves as a guide to the surgeon in regard to the amount of lung which must be resected, but it is time consuming and in the majority of cases will offer little further diagnostic information than has already been obtained from fluoroscopy and X-ray. It is advisable to instill oil on the involved side first, obtain an anterior-posterior and lateral film and then, if there is a stenosing lesion, obtain a spot film at this time also. The opposite side should then be filled and anterior-posterior, Bucky and oblique films obtained. Artificial pneumothorax plus X-ray examination furnishes valuable information in some cases. Its use is indicated when it is difficult to determine the origin of a lesion, i. e., whether it arises in the parenchyma, mediastinum or chest wall. Advantage should be taken of certain factors affecting the quality of roentgenogram such as (*1*) the rotating anode tube, (*2*) a photo-timer or similar device, (*3*) intensifying screens of relatively small crystal size and cassettes with good contact. The modification of the optimum kilovoltage technique as described by Fuchs is of significant value in producing films of uniform quality and great diagnostic potentialities. The three principal types of X-ray films are technically easy and economical. Their diagnostic advantages are manifold.—*The Roentgen Appearance of Lobar and Segmental Collapse of the Lung (Technic of Examination), L. L. Robbins, C. H. Hales & O. E. Merrill, Radiology, May 1945, 44: 477.*—(*G. F. Mitchell*)

Lobar and Segmental Collapse of Lung.—This paper is intended to describe the roentgen appearance of certain structures which are likely to change in shape, size, position or contour when a lung, or any part of a lung, becomes collapsed. Some changes are only suggestive while others are pathognomonic of the presence of collapse. These observations are the result of the detailed study of 1,200 cases of tumor, bronchiectasis, foreign body, tuberculosis and 160 healthy young adult hospital employees. The similarity of the two sides of the chest offers in most cases a reliable means of discovering unilateral abnormalities. Thus, comparison of an abnormal lung with its normal opposite will often make an accurate diagnosis of collapse of a lobe or segment of a lobe possible. The study has demonstrated, that, in addition to the variations accepted as diagnostic of collapse, i.e., an abnormal shadow of increased density, elevation of the diaphragm, displacement or shift of the mediastinum and narrowing of the rib spaces, there are three additional anatomical factors. These factors are: (*1*) the appearance and arrangement of the vascular shadows in the peripheral portions of the lung fields, (*2*) the appearance and position of the hilar shadows and (*3*) the demonstration of the actual size of the lobe as determined by the appearance and position of the septa or fissures of the lung. Anatomically the hila are approximately at the same level, though in the X-ray film the left hilum appears to be a little higher due to the fact that the left pulmonary artery is more clearly seen than the eparterial right main bronchus. Any marked deviation in the position of the hilum and in the pattern of the adjacent vascular structures strongly suggest spatial rearrangement within the lung. Thus collapse of an upper lobe moves the hilum upward, and in collapse of the lower lobe, the hilum moves downward. This may at first give the impression that the hilum of the involved lung is smaller. A comparison of the vascular structures in the periphery of the lung fields may show spatial rearrangement. Thus, greater separation of normal vascular network suggests that one portion of a lung or lobe occupies a much greater spread than normally. In the majority of cases it is possible to demonstrate the actual boundaries of the individual lobes by means of the postero-anterior and lateral roentgenogram. Lateral film and fluoroscopy will accurately localize a lesion seen in the postero-anterior film. In many persons about one-third of the lower lobe is below the horizontal plane of the dome

of the diaphragm and is not demonstrable on either single or stereoscopic X-ray films. Major septa are demonstrated only on the lateral roentgenogram. In this projection they run roughly from the level of the fifth thoracic vertebra posteriorly to the most anterior portion of the diaphragm. The greater septa may usually be distinguished from each other since on the right side it is met by the minor septum, and the leaf of the diaphragm the septum meets can usually be identified. Both postero-anterior and lateral films are of value in demonstrating the minor septum. This appears as a gently curved line extending from the anterior chest wall at about the level of the anterior portion of the third to fifth ribs to meet the greater septum in the mid-chest. The posterior portion does not change position, but the anterior portion moves upward during inspiration. A change in the position or course of a major septum will become more readily apparent if it is compared in the lateral projection with the septum on the opposite side of the chest. Any marked variation of the position or contour of any septum is strongly suggestive of spatial rearrangement and should be correlated with the study of the appearance of the peripheral vascular shadows and the position of the hilum on each side of the chest.—*The Roentgen Appearance of Lobar and Segmental Collapse of the Lung: II. The Normal Chest as It Pertains to Collapse, L. I. Robbins & C. H. Hale, Radiology, June, 1945, 44: 543.*—(*G. F. Mitchell*)

Tomography.—Tomography is regarded to be of value in the diagnosis of tuberculous cavities which cannot be seen in the plain film. However, even when cavity is not suspected, tomograms can still be of material aid in evaluation of tuberculous processes. The full extent of infiltrations is often not appreciated in the plain film, especially in the apical field. The over-lapping of clavicle and ribs, and the differentiation of pulmonary infiltrations from a thickened apical pleura are an important indication for tomograms. Serial tomograms can often be of special aid in evaluation of healing or progression of single infiltrates. Lastly, it is often possible to get a clear picture of distortions and stenosis of the bronchial tree with the aid of tomograms.—*Die Bedeutung der Tomographie bei der nicht-kavernösen Lungentuberkulose, F. Rotach, Schweiz. med. Wchnschr., November 24, 1945, 75: 1029.*—(*H. Marcus*)

Bronchography.—Good anesthesia of the pharynx, larynx and trachea is the *sine qua non* of adequate bronchography. Phenobarbital is given one hour before the procedure. With the patient seated in a straight-backed chair and his head tilted far backward, he is instructed to hold his tongue out with a piece of gauze and to breathe audibly to help prevent swallowing the anesthetic agent which is given, 5 cc. at a time, drop by drop, into one nostril. The solution consists of: cocaine hydrochloride 2.0 g., phenol 0.2 g.,epinephrine (1:1000) 10.0 cc., distilled water *q.s.ad* 150.0 cc. This solution is warmed to body temperature before using. Slowness of injection is important: 5 cc. should take five minutes. Coughing, which frequently occurs when the fluid reaches the glottis, is encouraged at this time as it helps to clear the bronchi of secretions. Two additional injections of 5 cc. each are made at least five minutes apart. The patient is then seated on a rolling table against an upright fluoroscope and cautioned not to cough or swallow until the procedure is completed. The suspected lung is examined first by having the patient lean backward and toward the affected side with the elbow and forearm supported on a pillow. Under fluoroscopic control 8 to 10 cc. of the iodized oil (at room temperature) are injected into the nostril drop by drop, exactly as was the anesthetic agent. When the posterior branches of the lower lobe bronchus are visualized, the patient bends forward, still leaning toward the affected side, to fill the anterior branches of the main lower lobe bronchus, as well as the middle lobe bronchus on the right or the lingula of the left upper lobe. Anterior and lateral X-ray films are taken at this time. Another 5 cc. of oil are injected with the patient still leaning towards the affected side. He then lies for

two minutes on his affected side with his shoulder hanging over the edge of the table. In this position the upper lobe bronchus and its branches may be filled. X-ray films are again taken in the anterior and lateral prone positions. The other side of the chest is then similarly examined, if desired, the only difference is the taking of oblique, upright and prone films instead of lateral views to avoid superimposition of the bronchial trees of both lungs. Three illustrated cases are presented in the paper.—*Bronchography: Details of a Simple Method, P. S. Slater, Quart. Bull. Sea View Hosp., January, 1946, 8: 47.*—(*P. Q. Edwards*)

Histoplasmosis in Children.—The literature is reviewed from 1906 when Darling first described a case of "protozoon infection producing pseudo-tuberculosis in the lungs and focal necrosis in the liver, spleen and lymph nodes." He suggested the name *Histoplasma capsulatum* for the organism and "Histoplasmosis" for the disease. At first a rarity, since 1936 reports have appeared from all over the world, especially from the United States. In 1934 DeMonbre first cultivated the organism and classified it as a fungus. There have been 81 reported cases to date, 21 of which occurred in children, of whom 15 were less than 15 months of age. A case report is given together with a summary of the other 20 cases reported as having occurred in children. Most of these cases were from the North Central region of the U. S. The age range was from 7 weeks to 12 years. The duration of the disease was from one week to seven months with an average of three months. In adults the disease may appear as localized nodules or ulcers in the skin or mucous membrane or, more often, it is a systemic infection with special involvement of some organs—lungs, gastrointestinal tract, heart or joints. In infants the symptoms are different—fever, pallor, diarrhea, loss of weight or failure to gain, difficulty in feeding, chronic cough, irritability, abdominal distension, cyanosis with feeding, hepatomegaly, splenomegaly, lymphadenopathy, purpura, anemia, leukopenia. The diagnosis is made by biopsy of the lymph nodes, spleen, bone marrow or cutaneous lesions or by blood smears which are occasionally positive. Blood culture on blood agar or on Sabouraud's medium requires several weeks. Lastly, the cutaneous test may be helpful. The prognosis is uniformly poor. Only one patient has been reported symptomatically well, four years after treatment with an antimony compound. Other cases have failed to respond to antimony, sulfonamides, etc. Nothing is known as to the mode of entrance of the organism into the body. Intrauterine infection seems possible where symptoms develop before 3 months of age.—*Histoplasmosis in Children, A. M. Iams, M. M. Tenen & H. F. Flanagan, Am. J. Dis. Child., October, 1945, 70: 229.*—(*K. R. Boucot*)

Fluid in Pleural Space.—In a study of 274 proved cases, 61 per cent (169 cases) were due to malignancy, two-thirds of these to intrathoracic or breast carcinoma. In one-third (44 cases) the aspirated fluid showed malignant cells. When the fluid is bloody there is a 95 per cent chance that a malignant process is present, provided congestive heart failure can be ruled out. In these cases, a bloody effusion may indicate pulmonary embolus with infarction (5 of 8 cases). Of the whole group, heart failure was found in 15 per cent (42 cases); pneumonia in 9 per cent (24 cases); tuberculosis in only 6 per cent (16 cases); cirrhosis of the liver in 3 per cent (8 cases, in 2 of which the effusion was bloody); chronic nephritis in 3 per cent (7 cases); miscellaneous conditions in 3 per cent. In 170 other cases the underlying disease was not proved. Of these, 58 had a tentative diagnosis of tuberculosis and 46 cases of suspected malignancy. Chylous fluid, frequently due to neoplastic diseases, is diagnosed only if the pleural fluid is carefully examined. When chylothorax is suspected, the fluid should be stained with Sudan III and chemically analysed for fat.—*Significance of Fluid in the Pleural Space, W. S. Tinney & A. M. Olsen, J. Thoracic Surg., June, 1945, 14: 248.*—(*W. M. G. Jones*)

Hypercalcemia in Sarcoidosis.—Abnormal values of the blood calcium in Boeck's disease have only rarely been recorded. In the past, two authors have reported a total of 11 cases of sarcoidosis in which the blood calcium has been elevated up to 15 mg. per cent. To these cases the authors add 3 cases of their own. No definite explanation for the hypercalcemia can be given at the moment. The most likely hypothesis is that sarcoidosis, with its tendency to involve bone, can be much more diffuse than is appreciated from the examination of roentgenograms of the skeleton. That bone involvement frequently occurs in the form of cystic degeneration is well known. However, bone may be extensively involved by disseminations of Boeck's lesions which are too small to appear on the X-ray film, but sufficiently numerous to influence the blood calcium. Diffuse bone lesions may raise the blood calcium primarily or secondarily through their influence on the parathyroid glands, such as is also seen in myeloma, osteomalacia, rickets, etc. One of the author's cases had very diffuse calcifications throughout the parenchymatous organs. In addition to miliary calcification in the lungs, there was calcification of a degree sufficient to produce X-ray alterations in the kidneys, spleen, gastric mucosa, periarticular spaces, small and medium sized arteries, together with a peculiar abnormal calcium deposition in the bone. This patient also showed pronounced signs of renal insufficiency, so that one may assume the additional renal factor in the disturbance of calcium metabolism. The calcifications in the parenchymatous organs may partly be due to calcifications of preëxisting Boeck's lesions, as for instance in the lungs, or they may be due to true metastatic calcifications in normal tissue. The authors advise the examination of the urine for abnormal calcium excretion in all cases of sarcoidosis.—*Hyperkalzaemie und Organverkalkung bei Boeck'scher Krankheit, A. Schüpbach & M. Wernly, Acta med. Scandinav., November 3, 1943, 115: 401.*—(*H. Marcus*)

Hemothorax and Hemopneumothorax.—Diagnosis of hemothorax as a result of war injury was made mainly on the basis of flatness on percussion and absent tactile fremitus. In basal collapse the signs are limited to the paravertebral region, the breathing is bronchial, dulness less marked and moist sounds more common. In consolidation moist sounds occur, breathing is tubular, fremitus is normal or increased and signs are limited neither to axilla nor paravertebral area. Pneumothorax is diagnosed when the percussion note is hyperresonant. Treatment consists in aspiration done as early as possible. As much blood or air was removed as was possible without causing severe symptoms in the patient. Aspiration was done every other day. Air was aspirated as completely as possible at the start so that adhesions might take place between the apex of the lung and the parietal pleura.—*Traumatic Haemothorax and Haemopneumothorax, T. Simpson, Lancet, October 27, 1945, 249: 521.*—(*J. Gerstein*)

Spontaneous Pneumothorax.—One hundred and twenty-six patients with 129 episodes of spontaneous pneumothorax were observed among military personnel in the Army Air Forces Training Command. One patient had one recurrence and one patient had two recurrences. The age of the patients was between 18 and 41 years. There were no immediate fatalities. The onset was gradual in 17.8 per cent of the cases. Initial symptoms were absent or mild in 63.5 per cent. In 76 patients there was nothing in the past history that had any reasonable association with the onset of spontaneous pneumothorax. None of the onsets occurred during flight. In 48.6 per cent the onset was associated with a minimum of physical activity. In 13.6 per cent it was associated with extreme physical activity. The valvular type of pneumothorax occurred only twice. Spontaneous pneumothorax was seen on the right side in 59.8 per cent. A collapse of less than 50 per cent on the roentgenogram was observed in 59.5 per cent. The cause could usually not be found. Emphysema, pulmonary tuberculosis, pneumonia, pleurisy were each the cause of one spontaneous pneumothorax. The average number of days required for the air to be absorbed was

31.1. Three out of 4 patients were salvaged for further military duty. Seven patients gave a history of previous episodes of spontaneous pneumothorax. It is believed that rupture of an emphysematous bleb is probably the most common cause of spontaneous pneumothorax.—*Pneumothorax in Young Adult Males: Descriptive Statistics in One Hundred and Twenty-six Cases, J. E. Leach, Arch. Int. Med., November–December, 1945, 76: 264.*—(*G. C. Leiner*)

Spontaneous Pneumothorax.—The authors were impressed by the number of inductees giving a history of spontaneous pneumothorax. That it seldom results in tuberculosis is well known, but many who have experienced it have been unduly alarmed, over-cautioned and developed chest symptoms bordering on hysteria when these cases should be treated like the accidents they really are. One hundred unselected cases were observed months to years after collapse. There was no notable predilection for either lung. It appeared to occur most often in the third decade of life and in none was there any occurrence before 16 years of age. About 2 per cent experienced recurrences, most being on the same side, and seldom occurring after 30 years of age. If two years had elapsed since the spontaneous pneumothorax occurred, the chance of recurrence is only about 10 per cent. As far as could be ascertained, none of the men were suffering from any chronic respiratory disease at the time and, except for 6 who experienced the condition following cough associated with acute respiratory disease, all were in good health. In 63 the spontaneous pneumothorax occurred during slight physical activity; 5 were asymptomatic and surprised to learn of its presence. In only 30 did it develop during intense physical exertion. It was found most frequently in the white race, rarely being seen in the colored in spite of the large number of the latter inductees. The authors are inclined to believe that the colored are less sensitive to the symptoms and therefore it goes undiscovered. Sixty-five were seen two or more years after reëxpansion and all except 4 chest films appeared perfectly normal. In none could it be predicted from the film if there would be a recurrence. There was a residual pleural thickening in one case who had had a hemopneumothorax, and one man had a productive lesion in the contralateral lung. A "queer feeling" in the chest and respiratory distress were the outstanding symptoms at the time. In some a diagnosis of pleurisy had been made, the chest strapped and the true diagnosis discovered following X-ray examination. In not a few instances among older men a diagnosis of angina pectoris or coronary occlusion was made. The treatment usually consisted of several weeks of bed-rest, the patient being allowed to return to work anywhere from three weeks to six months or a year after the lung was reëxpanded. Advice offered by their physicians as to the man's activity varied from urging a cautious almost vegetable existence to advising the patient to forget about it. Some had been cautioned that tuberculosis might develop. Many men were, therefore, unduly apprehensive as to the possibility of future complications.—*Idiopathic Spontaneous Pneumothorax: History of 100 Unselected Cases, L. Schneider & I. I. Reissman, Radiology, May, 1945, 44: 485.*—(*G. F. Mitchell*)

Bronchoscopy.—The advantages of bronchoscopy, from a diagnostic and therapeutic standpoint, are described with relation to nontuberculous pulmonary disease. In 2 cases the diagnosis of bronchial neoplasm was made and appropriate treatment could be instituted. In one case a foreign body in the lung was successfully treated. In one case the diagnosis of inflammatory bronchial polyp with obstruction was made and excision performed. In 2 cases bronchoscopic drainage resulted in marked amelioration of symptoms. One was in an infected bronchiectatic cyst, the other in an infected cyst in pulmonary cystic disease.—*De la bronchoscopie dans les affections pulmonaires chroniques non tuberculeuses, J. P. Secretan, Schweiz. med. Wchnschr., November 18, 1944, 74: 1198.*—(*J. Gerstein*)

Immunization against Pneumonia.—Many studies on prophylactic immunization against

pneumococcal pneumonia have been made, using a number of different antigenic preparations. The results, in the main, have been beneficial. In most of the studies, however, certain variables have clouded the interpretation of these results. Among the variables, the following appear to be of the greatest moment: differences in the composition of the immunized and control groups; uncertainty as to whether the specific pneumococcal types included in the vaccine were the same as those currently causing pneumonia; failure to determine whether the observed decline in cases in the immunized group was due to a decrease in cases caused by the pneumococcal types included in the vaccine; inadequate control of the antigenicity of the preparations used. In the present study, it is believed that the important sources of error have been eliminated, hence results can be interpreted with more assurance than has been previously possible. This study deals with the immunization of man with the polysaccharides of certain types of pneumococci. It has been demonstrated that the specific capsular polysaccharides are highly antigenic and they have other advantages. They rarely produce local abscesses associated not infrequently with whole pneumococcal vaccines, and a stable, water-clear solution of known composition can be prepared with them. The population chosen for vaccination, that of an Army Air Force Technical School, was large and the average duration of stay was six months. All the men spent the bulk of the day in close, indoor contact with one another. The School generally reacted to respiratory diseases as a whole and not by its individual component groups or units. From the point of view of experimental epidemiology this uniform behavior of the School population was a valuable trait. During the two preceding winters, (1942–44) high epidemic rates for pneumococcal pneumonia had prevailed in the school. Types II, I, V, VII, XII, and IV, in that order, caused 75 per cent of the cases of disease, the rates for the individual types being approximately the same for each year. The living conditions and duties during the season of the experiment (winter, 1944–45) were unchanged, and the expectation was that the incidence of pneumonia would still be high and that the same types would persist. Accordingly, the solution used for immunization contained the specific capsular polysaccharides of pneumococcus types I, II, V and VII. Type XII and type IV remained as controls. Beginning September 20th, 1944, immunization by a single subcutaneous injection in the dose of 1 ml., containing from 0.03 to 0.06 mg. of each polysaccharide, was carried out on alternate members of the population. This insured a thorough mixing of immunized and non-immunized subjects in all phases of their activities. In all, 8,586 men received the vaccine and 8,449 were injected with saline (controls). The man-days of exposure were approximately the same for each group. Laboratory facilities were available for the typing of all cases of pneumonia. In addition, a continuous carrier survey for pneumococci was carried on throughout the period of observation, the total sample being 3,757 pharyngeal cultures with an overall pneumococcal rate of 57.7 per cent. The injection of the capsular substances as described was found to be effective in preventing pneumonia caused by the types in question but not that due to heterologous types. During the seven months of observation following the beginning of the immunization program, 4 cases of pneumonia caused by types I, II, V or VII occurred in the vaccinated group, as opposed to 26 cases among the non-vaccinated. There were 14 cases of type II pneumonia among the controls and only one in the vaccinated group. Yet there is no reason for believing that polysaccharides, of types I, V, and VII should differ in their immunizing capacity from that of type II. It is interesting to note that the 4 men who developed pneumonia of a type against which they had been immunized all did so within the first two weeks following the immunization injection. Tests for circulating antibodies were done on 8 vaccinated men and immunity was found to develop

from between six and nine days after injection, but usually required from three to six weeks to reach its maximum. This may explain why the only cases of homologous type pneumonia in the vaccinated group developed during the first two weeks after immunization. The incidence of the other types of pneumonia was about the same, 56 cases in the immunized group and 59 in the non-immunized. Thirty-two men in the immunized group and 59 in the non-immunized carried pneumococcus types I, II, V, or VII, or 1.79 and 3.26 per cent, respectively. The distribution of all other types was about the same in both groups, type XII being the most prevalent organism and also the cause of more cases of clinical pneumonia than any other single type during the 1944–45 season. Fifty-eight per cent of the total population were found to be carrying pneumococci of one or more types. The evidence suggests that immunizing one-half of the school population not only was effective in reducing the carrier rate for types I, II, V and VII in the immunized group, as shown above, but apparently prevented the development of high carrier rates in the non-immunized population. Of equal importance with the prevention of types I, II, V and VII pneumonia in immunized subjects was the reduction of infection to these types in the non-immune population as compared to the experience of the two previous winters. The observed incidence of pneumonia was one third or one fourth of the expected incidence. The conclusion is inescapable that immunization of half the population greatly reduced the incidence of the disease in the non-immune half. It explains why the number of cases available for testing the effect of the immunization was so far below the expected. The lessened number of contact cases and the lowered carrier rate in the immune group could well be responsible for this. Because of the relatively low incidence of pneumococcal pneumonia in civilian populations, anti-pneumococcal immunization is unlikely to become a general procedure. In certain groups at a greater risk, for example foundry workers, miners and inmates of mental institutions, however, immunization would appear to be desirable. In military populations the greatest incidence of pneumonia occurs in new recruits, so that most benefit would be derived from immunization of this group.—*Prevention of Pneumococcal Pneumonia by Immunization with Specific Capsular Polysaccharides, C. M. MacLeod, R. G. Hodges, M. Heidelberger & W. G. Bernhard, J. Exper. Med., December, 1945, 82: 445.—(J. S. Woolley)*

Penicillin in Experimental Pneumonia.—Pneumonia was produced in rats by introducing pneumococci by intratracheal intubation. A strain of type-I pneumococci was used. The animals received 0.15 cc. of a 1:100,000 dilution, the final dilution being in mucin. The median survival time of animals infected in this way was found to be 2.9 days. Infected animals were divided into four groups. The first group served as untreated controls and the others were given penicillin, at various times after infection, by subcutaneous or intramuscular injection, or by inhalation of an aerosolized solution. The sodium salt of penicillin was dissolved in the proper amount of M/50 phosphate buffer, pH 7.3, to give the desired concentration. The subcutaneous injections were made under the skin of the back and the intramuscular injections in the muscles of the hind leg. For aerosolization the animals were exposed to nebulized (DeVilbiss 40 nebulizer operated by compressed air) solutions transmitted through an eight-chambered glass manifold. The rats were confined in small wire cages and the bodies of the animals did not come in contact with the mist. By estimating the amount of phosphate in the aerosol the dilution of the penicillin could be readily determined, and from this the amount of penicillin that each animal received. In order to evaluate the three methods of therapy, it was undesirable to have a 100 per cent survival rate. Hence the dosage and its frequency were controlled by this factor. In all instances the penicillin was administered

at different periods after treatment, the time varying from three to twenty-four hours. The doses (from 250 to 500 units per rat) were of the same order of magnitude for the three methods of administration as evidenced by the concentration of penicillin in the urine. Most of the rats with experimental pneumonia yielded to therapy with penicillin. As good results followed penicillin given as an inhalant as after its injection.—*The Control of Experimental Pneumonia with Penicillin: I. Comparison of Inhalation and Injection Therapy, Catherine E. Wilson, Carolyn W. Hammond, Anne F. Byrne & Eleanor A. Bliss, Bull. Johns Hopkins Hosp., December, 1945, 77: 411.*—(*J. S. Woolley*)

Penicillin in Chest Wounds.—A series of over 500 penetrating wounds of the chest were studied. Parenteral penicillin therapy was used only occasionally. The indications are: (*1*) when pulmonary suppuration or severe infection exists with a pyothorax that is being surgically drained; (*2*) in severe chest-wall lesions, associated with an open sucking septic pneumothorax. For a simple or infected hemothorax penicillin given parenterally is of little or no value. Penicillin is used locally in hemothorax as a prophylactic measure. At the forward units the intrapleural injection of 60,000 units in 6 to 10 cc. at the end of the first two or three aspirations is advised. In the general hospitals the uninfected hemothorax is treated by aspiration without intrapleural instillations except: (*1*) where there is coexistent chest-wall sepsis; (*2*) when there is recognized or suspected pulmonary infection; and (*3*) at the conclusion of a thoracotomy for foreign-body removal, penicillin, 120,000 units in 10 cc. of saline, is instilled after air has been drawn off. Penicillin is of greatest value in the treatment of infected hemothorax and empyemata. Intrapleural therapy is useless for effusions caused by Gram-negative organisms and penicillin-resistant staphylococci. The procedure used is to aspirate the effusion and inject 120,000 units of sodium penicillin for large cavities and 60,000 units for smaller ones in 10 to 20 cc. of solution, on alternate days. This is continued until three specimens of the fluid have been reported to contain no pyogenic organisms on smear or culture. In chest-wall wounds, the septic chest-wall is excised and the closure is by suture; penicillin solution is introduced through a tube. This treatment is very successful even in the presence of frank pus.—*Penicillin in Wounds of the Chest, A. L. D'Abreu & J. W. Litchfield, Brit. M. J., April 21, 1945, 1: 553.*—(*D. H. Cohen*)

Enterococcus Pneumonia.—Serious infections due to Lancefield Group 4 enterococci have been reported in the genito-urinary system, in the biliary tract, in peritonitis, endocarditis, sepsis, appendicitis and meningitis. The first report of pneumonia due to an enterococcus appeared in 1933. Since then many cases are on record. Clinically the disease is characterized by a severe, but usually benign course. High fever and leucocytosis are the rule. The disease is frequently bilateral and on the X-ray film appears as a patchy bronchopneumonia. The sputum in 7 cases reported in this paper contained enterococci, once in pure culture, and six times in association with staphylococci or streptococci. Pneumococci were absent in all 7. Clinically the disease is characterized by its resistance to sulfonamide therapy. This feature is so characteristic that enterococci should be specifically looked for in the sputum of all patients who were adequately but unsuccessfully treated with sulfa drugs. It is possible that enterococci are the cause of many atypical pneumonias which are characterized by a protracted course, fever and a hemorrhagic copious sputum.—*Über Enterokokkenpneumonie, H. Lüdin, Schweiz. med. Wchnschr., December 1, 1945, 75: 1058.*—(*H. Marcus*)

Sulfonamides in Pulmonary Abscess.—Thirty-one cases of lung abscess were treated with different sulfonamide preparations. The

total doses were equal to 80, 90, 150, 200 and even 315 g. of sulfanilamide. While a temporary decline of the fever curve and diminution of the sputum were sometimes observed, no permanent effect could be seen.—*Yüksek doz sulfamidlerle iyi olmiyan 31 akciğer çibani vak'alari, Muzaffer Şevki Yener, Türk Tip Cemiyeti Mecmuasi, December, 1945, 11: 533.*—(*O. Felsenfeld*)

Lung Abscess following Shock Therapy.—Two cases are reported in whom a lung abscess developed following treatment with electric shock for manic-depressive psychosis. In both cases the abscess developed in the left lung near the hilum. Treatment with penicillin resulted in cure in one case, in improvement in the other case. Shock treatment apparently produces conditions favorable for the development of a lung abscess. During the convulsion there is probably a circulatory stasis in the lower parts of the lungs, possibly with local thrombosis. The patient is apneic for a while, then breathes deeply and may aspirate pathogenic organisms from the upper respiratory tract.—*Accident rare au cours du traitement par l'électro-choc: pulmonaire, A. Pelletier, G. H. Larue & M. Samson, Laval méd., December, 1945, 10: 726.*—(*G. C. Leiner*)

Vitamin C in Wound Healing.—Three factors of vital importance in poor wound healing are low blood protein, allergic reactions against the suture material and low blood ascorbic acid. Experiments by many workers show that the tensile strength of the scar depends upon the amount of ascorbic acid in the tissues. In scurvy, fibroblasts will grow in the scar but the quantity of intercellular collagenous tissue varies with the intensity of the scurvy. Ascorbic acid is found in measurable quantities in all tissues, notably in plasma (normal 0.8 to 1.2 mg. per cent); and white cells and platelets (25 to 38 mg. per cent). If no ascorbic acid is found in cells and platelets a dangerous deficiency of vitamin C is present, and in such a state operation is extremely dangerous because no sutured areas will securely heal. This is particularly important in chest surgery with reference to healing of bronchial stump and gastro-esophageal anastomosis. Patients with chest complaints who come to surgery usually have low ascorbic levels even before surgery. In a series of 22 patients, the average was only 0.15 mg. per cent. The operation by itself considerably reduces the ascorbic levels still lower, according to the severity of the surgical procedure, and this level remains low according to postoperative complications and treatment. A single determination of the ascorbic acid level of plasma is not the most reliable index of the vitamin C condition of the patient because of fluctuations in the diet. A determination of the vitamin C saturation, testing plasma levels during five hours after an intravenous dose of 1 g. of ascorbic acid is better. In cases of deficiency the plasma level quickly returns to zero. When the tissue concentration is higher, the level of the plasma will fall more slowly. Except in cases of severe deficiency, as found in patients with stenosis of the esophagus, it is possible to maintain an almost normal plasma ascorbic acid level before and after operation by administration of 1,000 mg. of ascorbic acid every day (best given in divided doses). Every patient with a chronic surgical chest condition should be given high doses of ascorbic acid before and especially after important surgical procedures to ensure adequate wound healing. [An excellent bibliography is appended.]—*The Importance of Ascorbic Acid (Vitamin C) in Chest Surgery, E. de Jesus Zerbini, J. Thoracic Surg., August, 1945, 14: 309.*—(*W. M. G. Jones*)

Postoperative Chest Complications.—One hundred herniorrhaphies and one hundred meniscectomies in males of similar ages were compared. Half of each group were performed with ether anesthesia and half with gas and oxygen. There was no difference between the different anesthesia groups, but there was a greater number of chest complications in the herniorrhaphy group, irrespective of the anesthetic agent used.—*Postoperative*

Chest Complications: Controlled Study in Hernia and Meniscectomy Operations, F. R. Gusterson, Lancet, October 6, 1945, 249: 431.—(J. Gerstein)

Cerebral Abscess from Chest Infections.—The rôle of the spinal veins. It is claimed that the high incidence of cerebral abscess in chronic chest infections is due to the transportation of infected material from chest to brain by the spinal veins which are valveless, permitting blood flow in either direction. Points of value in arriving at this conclusion are that these cerebral abscesses are found predominantly in males; the disease rapidly reaches a fatal termination; it follows chronic disease of either lungs or pleurae; surgical intervention increases the danger of cerebral abscess; similar abscesses seldom are found in other parts of the body. To explain these associations it was for many years taught that cerebral abscesses were produced by septic emboli from pulmonary septic foci. However this theory does not fit all the facts. Septic emboli may lodge anywhere; they produce signs of embolism and result experimentally only in meningitis. Cerebral abscesses following empyema do not fit this theory. Other current theories are discussed. It was noted that a large number of malignant cerebral abscesses are found in carcinoma of the breast — 23 per cent as compared with 35 per cent from the bronchus. This suggested a thrombotic origin via the bronchial and intercostal veins which drain both the lung and chest wall into the azygos veins. Veins from around the spinal cord also drain into the azygos system. These veins communicate above with the venous sinuses of the skull. Injection experiments on cadavers showed that radiopaque material injected into an intercostal vessel readily entered these spinal veins. Animal experiments (in cats) were, however, not successful. It is believed that thrombi in intercostal vessels are usually carried to azygos vessels and thence to the superior vena cava and to pulmonary bed without ill effect. When, however, there is a reversed flow in the spinal veins, then the thrombi may enter this system and be carried directly to the brain. These conditions will be present while coughing, or straining at stool, or when the patient is lying flat on his back. By this theory, all the facts of the case mentioned are explained: the exclusive involvement of the brain is easily understood; operative interference is dangerous due to the close proximity of infected tissue to an intercostal vein; in acute conditions the veins in chest wall are not involved; the greater activity of the chronically sick encourages dislodgement of thrombi; lung abscess and bronchiectasis only produce this condition when because of chronicity or surgical treatment there are adhesions and pathways to involve the intercostal system. The clinical importance of this theory is that when a rib resection is performed for surgical drainage the intercostal veins should be ligated so that there will be no chance of a process of thrombosis spreading to them.—*The Etiology of Cerebral Abscess as a Complication of Thoracic Disease, J. L. Collis, J. Thoracic Surg., December, 1944, 13: 445.—(W. M. G. Jones)*

Wounds of Mediastinum.—Through-and-through bullet wounds of the mediastinum are grave, but young and vigorous men often survive if they can be treated early. The treatment consists of absolute rest and heavy sedation with morphine for the first forty-eight hours. Not even the clothes are removed, but plasma or blood is given, as is intramuscular penicillin every three hours. These patients usually have a hemothorax which requires aspiration, but it is considered unwise to aspirate within the first forty-eight hours for fear of disturbing the pressure relations in the thorax and thus encourage bleeding from severed pulmonary or mediastinal vessels. Infection of the hemothorax did not occur in the 3 cases observed. One case had a hemopericardium as well. Instillation of 40,000 units of penicillin into the pleural cavity followed each aspiration of the hemothorax.—*Through-and-through Bullet Wounds of the Mediastinum, T. S. Norris,*

Lancet, October 13, 1945, 249: 464.—(H. Marcus)

Duodenal Obstruction by Tuberculous Lymph Nodes.—It is well known that varying degrees of compression of the duodenum may be caused by masses of enlarged lymph nodes as well as by lesions occurring in the head or body of the pancreas. A case is, therefore, reported in which severe constriction and partial obstruction of the duodenum were observed with relatively little widening of the duodenal curve. A twenty-three year old colored youth, previously hospitalized for right pleural effusion, was admitted to Mt. Sinai Hospital two years later, complaining of epigastric pain, vomiting and progressive weight loss. Gastro-intestinal X-ray series revealed definite gastric retention (75 per cent); constriction of pylorus, duodenal bulb, proximal portion and second portion of the duodenum. Slight widening of the duodenum was also present. Tuberculin tests were negative and sputum and gastric contents revealed acid-fast bacilli. While the findings fulfilled the criteria for diagnosis of carcinoma of the head of the pancreas, the long course and absence of jaundice tended to rule this out. Surgery, undertaken to relieve the obstruction and establish a diagnosis, confirmed the diagnosis of enlarged lymph nodes. Biopsy of one of the nodes revealed a hyperplastic tuberculosis with caseation.—*Duodenal Obstruction Due to Tuberculous Lymphadenitis, R. H. Marshak & D. Dreiling, Radiology, May, 1945, 44: 495.—(G. F. Mitchell)*

Eosinophilic Infiltrations.—It is generally conceded that eosinophilic pulmonary infiltrations, as first described by Löffler, can be caused by a variety of allergens in patients who have a tendency to react with allergic manifestations. Autopsy reports of the condition are few, but those available show that the pulmonary lesions are eosinophilic bronchopneumonias with or without bronchial involvement. Pneumococci or other microorganisms cannot be regularly demonstrated in these lesions. Recent reports also make it likely that eosinophilic infiltrations need not be restricted to the lungs. Infiltrations in the liver have been described in one case, and another case had eosinophilic infiltrations in the epididymis. Eosinophilic infiltrations are apparently an expression of a general hypersensitive state and, because of the benign nature of the condition and the ease with which even relatively small alterations can be demonstrated in the lungs, the disease was previously thought to be restricted to the lungs. In the author's 4 cases, the pulmonary lesions were but one manifestation of a generalized disease. High blood eosinophilia was present in all 4 patients. One case showed localization in the ear with a discharge containing many eosinophiles and with central nervous systems signs with demonstration of eosinophiles in the spinal fluid. This patient also had signs and symptoms of myocardial disease and joint manifestations. Two patients had a past history of typical bronchial asthma. The pulmonary lesions were usually fairly extensive and bilateral. In 2 cases pneumococci were demonstrated in the sputum repeatedly and these patients responded well to the administration of sulfathiazol. Sputum culture for pneumococci is always indicated in patients suspected of eosinophilic pulmonary infiltrations in as much as chemotherapy seems to exert a specific beneficial effect in such cases.—*Ein Beitrag zur Frage nach der Pathogenese, Ätiologie und Therapie der eosinophilen Lungeninfiltrate, N. Alwall, Acta med. Scandinav., November 3, 1943, 115: 350.—(H. Marcus)*

Transient Pulmonary Infiltration with Death.—The condition of transient pulmonary infiltrations does not constitute a sharply defined pathological entity. Löffler distinguished between transient infiltrations of tuberculous etiology and those in tuberculin negative persons. Eosinophilia is not necessarily a predominating sign; transient infiltrations occur without eosinophilia. Conversely, an eosinophilia may exist in tuberculous infiltrations possibly on a hyperergic basis.

The allergic element has come more in the foreground and most investigators are inclined to believe that the infiltration of the lungs is due to an allergic reaction, related to asthma and urticaria, in hypersensitive persons. In an adult with an asthmatic history of one year, X-ray films revealed an infiltration of the right lung. He had an eosinophilia of 70 per cent. The patient died about five minutes after using, for the first time, a spray containing 10 per cent adrenalin. Post mortem X-ray films of the lungs showed barely perceptible remains of the infiltration, twenty days after its detection. Histological examination showed an abundant infiltration by plasma cells and lymphocytes at the involved site. At some places the lung structure was obliterated and the alveoli distended by different types of cells with conspicuous eosinophilia. There was an associated patchy hyperemia and edema. The cause of death was felt to be a rapidly arising ventricular fibrillation caused by the local effect of adrenalin on the lungs and reflex action on the heart resulting in fibrillation.—*A Case of Transient Pulmonary Infiltration with Eosinophilia, with Fatal Issue after Treatment by Adrenalin Spray for Asthma, O. J. Broch, Acta med. Scandinav., March 18, 1943, 113: 311.*—(*E. R. Loftus*)

Tropical Eosinophilia.—Fifteen cases of tropical eosinophilia are reported. The patients' main complaint was an irritating, non-productive cough; pain in the chest and dyspnea were also frequently complained of, but asthma was observed in only one patient. Twelve of the 15 patients were afebrile. Physical signs were unreliable. It appears that the duration of the disease, with exacerbations and remissions, may be as long as ten years. To the diagnosis, the presence of eosinophilia, is obviously essential. In most cases the onset of tropical eosinophilia is preceded by an infection of the respiratory tract without eosinophilia; this infection lingers on, sensitizes the patient in some way, and is eventually superseded by the varied picture of tropical eosinophilia. Exacerbations are accompanied by a rise in eosinophils. X-ray films of the chest show a diffuse mottling in many cases, resembling early pneumonoconiosis; unfortunately, this classical picture cannot be found in all cases. Sometimes only congestion can be seen or a pneumonic infiltration may be present; the hilar shadows are usually increased. There is no definite evidence of a relationship between tropical eosinophilia and syphilis, malaria, tuberculosis or helminthiasis. In the treatment arsenicals are commonly used, with good effect, although exacerbations lasting thirty-six to forty-eight hours are frequently observed. The lung lesions and eosinophilia apparently respond to sulfapyridine, too; how either of these drugs exerts its effect is not known, but their efficacy suggests that the disease is of infectious origin. Whether or not it is a new disease entity is still a moot question.—*Tropical Eosinophilia: A Report on Fifteen Cases, H. B. Lal, Indian M. Gaz., January, 1945, 80: 30.*—(*P. Lowy*)

Experimental Anaphylactic Pulmonary Lesions.—A peculiar type of pneumonitis occurs in some cases of acute rheumatic fever. The specific nature of these lesions can be recognized only histologically. Briefly, the changes consist primarily in focal damage to the small blood vessels, particularly the alveolar capillaries, with attending capillary thrombosis, exudation and hemorrhage. In some areas coagulation and inspissation of the fluid may produce a hyaline membrane that lines the respiratory bronchiole and its alveoli. No bacteria can be demonstrated in the tissue either by culture or stain. The lesions are decidely focal, frequently involving only a small segment of a vessel. Confluent foci, however, may result in considerable areas of involvement. It has been previously shown that focal lesions, histologically like those of rheumatic pneumonitis, occur in the lungs of non-rheumatic patients who develop anaphylactic reactions to the sulfonamides. This basic identity of the pulmonary lesions of rheumatic fever with those resulting from

anaphylactic hypersensitivity in man led to the study of the lungs of rabbits in which lesions, strikingly similar to those of rheumatic carditis, had resulted from anaphylactic "serum sickness." In the present paper the findings of that study are elaborated in an attempt to support the view that the lesions of rheumatic fever are due to hypersensitive reactions. Fifty-six rabbits were sensitized to horse serum, egg albumin or to a mixture of these. The antigen was administered intravenously. Sections of the lungs of all the rabbits were studied. Ten of the animals showed definite lesions. Three had been sensitized with serum, one with a mixture of serum and egg albumin and 6 with egg albumin alone The number of injections varied from one to 6 over a period of from one to three months. The time between the last injection and death varied from immediate shock to ten days. The pulmonary lesions found present in these animals exhibited, in varying degrees, focal capillary damage of the type that characterizes the pneumonitis of acute rheumatic fever and of sulfonamide hypersensitivity in man. This experimental finding is offered as further support of the view that the various lesions of rheumatic fever are dependent on anaphylactic hypersensitivity. (With 11 plates).—*The Experimental Production of Anaphylactic Pulmonary Lesions with the Basic Characteristics of Rheumatic Pneumonitis, J. E. Gregory & A. R. Rich, Bull. Johns Hopkins Hosp., January, 1946, 78: 1.*—(*J. S. Woolley*)

Biotropic Pneumonopathy.—The author has observed several cases where in the course of pneumonia, after the resolution of the pneumonic focus, pulmonary consolidation was present for days or weeks. This condition is called by the author "biotropic pneumopathy." It is caused either by syphilis or by tuberculosis. Five observations are described, of which 4 responded to treatment with bismuth and salvarsan. Only one had a positive Wassermann test but the successful treatment with antiluetics is proof enough of the syphilitic origin of the pneumonopathy. One case was caused by an old tuberculosis. These pneumonopathies are really fibrous reactions of the interstitial tissue of the lung which start at the same time as the pneumonia and not as a result of it. But while the pneumonia resolves in about eight days the biotropic interstitial reaction which causes a density in the X-ray film persists. X-ray examination shows evidence of thin fibrous tracts which may produce a deviation of the trachea and a shift of the heart. The biotropic pneumonopathy should not be confused with post-pneumonic intraalveolar fibrosis which is always of very bad prognosis.—*Pneumopatia biotropica en el curso de la pneumonia, M. Gonzalez Olaechea, Rev. méd. peruana, June, 1945, 18: 189.*—(*W. Swienty*)

Asbestosis.—The presence of asbestos bodies in the sputum is proof of a pathological tissue reaction in the lungs. The asbestos body consists of an asbestos fiber surrounded by hemosiderin. In contrast to silicosis, asbestosis usually does not show characteristic changes on the roentgenogram. Four case histories are presented: (*1*) A 42 year old man, who had worked in the asbestos-industry for eighteen years, complained of productive cough and dyspnea of three years' duration. The sputum contained asbestos bodies and no tubercle bacilli. The chest roentgenogram had an appearance similar to one in silicosis. This is the only case of asbestosis without tuberculosis that the author saw. (*2*) A 66 year old man, who had worked in an asbestos mill for twenty-two years, complained of cough of fifteen years' duration and increasing dyspnea. The findings on X-ray examination were the same as in silicosis. The patient developed renal tuberculosis and diabetes. (*3*) A 67 year old man, who had worked in an asbestos mill for forty-eight years, showed asbestos bodies and tubercle bacilli in the sputum. The autopsy proved the presence of tuberculosis and asbestosis. (*4*) A 57 year old man, who had worked in the asbestos industry for twenty-five years, died from lung carcinoma and asbestosis, proven by autopsy. The

chest roentgenogram had shown no sign of asbestosis, nor had there been any functional pulmonary damage due to asbestosis.—*Quelques considérations sur l'amiantose, L. Rousseau, Laval méd., January, 1946, 11: 57.*—(*G. C. Leiner*)

Broncholithiasis.—Broncholiths originate from calcified caseous tuberculous areas in the pulmonary parenchyma or lymph nodes, from inspissated pus of a lung abscess or an empyema, from calcified cartilages of the trachea and main bronchi. Ten cases of broncholithiasis were observed. Symptoms were cough, expectoration of calculi, substernal pain, hemoptysis, later suppuration with production of purulent fetid sputum, atelectasis. All patients were bronchoscoped. Eight patients expectorated a broncholith spontaneously; in 5 patients one or more broncholiths were removed by bronchoscope. In 6 cases the place of the erosion was identified bronchoscopically by inflammatory stenosis of the bronchus. The localization was the right middle lobe in 5 cases, the right lower lobe in 3, the left upper and the left lower lobe in one each. Follow-up bronchoscopic examination was done over an average period of twenty-five months. In no case was permanent cicatricial narrowing of the bronchus found. Residual cylindrical bronchiectasis is the most common complication.—*Broncholithiasis: Report of Ten Cases, J. R. Fox & L. H. Clerf, Ann. Int. Med., December, 1945, 23: 955.*—(*G. C. Leiner*)

Hodgkin's Disease and Tubercle Bacilli.—The present study is an attempted reëvaluation of the etiologic röle of human, bovine and avian tubercle bacilli in Hodgkin's disease. Six varieties of culture media and a series of chickens, guinea pigs and rabbits were inoculated with fresh macerated lymph node and splenic tissue emulsion. Thirty lymph nodes and 3 spleens were obtained surgically from 33 patients with histologically proved Hodgkin's disease and 10 control chickens were inoculated with tissue suspensions from other diseases. Eight rabbits, 4 control and 4 experimental, were inoculated in a similar manner. A group of 20 guinea pigs was sensitized with 1 to 3 mg. of killed tubercle bacilli (dry weight) according to the method of L'Esperance eight to twelve days previous to inoculation with Hodgkin's tissue suspension. Ten additional guinea pigs received only killed tubercle bacilli and were used as controls. In no instance were tubercle bacilli found except in the case of histologically, bacteriologically and clinically proved tuberculosis.—*Studies in Hodgkin's Syndrome: III. The Relationship of Tubercle Bacilli to Hodgkin's Syndrome, H. A. Hoster, C. A. Doan & M. Schumacher, J. Lab. & Clin. Med., August, 1945, 30: 675.*—(*F. G. Petrik*)

Intrathoracic Malformations.—In recent years an increasing number of congenital cystic lung changes have been described. Their importance has been somewhat altered from the earlier pathological anatomical interest to increased diagnostic interest and in many cases to therapeutic interest. The cause of the condition is probably not a question of a genetic unit; however, the prevalent explanations on the basis of fetal bronchiectasis, congenital lymphangiectasis, lung or bronchial adenoma are inadequate. It seems that the more neutral term of congenital cystic lung on a malformation basis is more applicable. The variation in the number and size of the cystic elements is dependent upon the stage of fetal development when the disturbance in development and the degenerative process occur. There may be an association with malformations in other organs such as the kidneys. Other authors have reported interesting cases in which diffuse cystic lung changes appeared simultaneously with a tuberous cerebral sclerosis. A case of bilateral disease is described in which the symptoms did not make their appearance until 14 months of age. The diagnosis was made by roentgenography disclosing a marked bullous emphysema. The condition was incompatible with life. A second case is reported in which the diagnosis of pleural

effusion was made in a one and one-half year old boy. The physical findings on admission indicated a massive pleural effusion, substantiated by X-ray findings. Thoracocentesis revealed thick greyish, sterile fluid which promptly reformed. A thoracoscopy revealed a large irregular tumor which was tentatively diagnosed as teratoma. A thoracotomy revealed a large cystic tumor which filled the left thoracic cage and caused deviation of lung and mediastinum to the opposite side. The report by the pathologist indicated that the tumor contained fat globules and mucus-secreting glands. The overall picture resembled that of fibroadenoma of the breast. The consensus was that this tumor was probably a matter of a simpler local malformation, though the possibility of a dermoid tumor could not be excluded.—*Intrathoracic Malformations in Young Children, B. Soderling & R. Thune, Acta med. Scandinav., February 12, 1943, 113: 239.*—(*E. R. Loftus*)

Diaphragmatic Malformation.—A four week old boy died in marked dehydration after continuous vomiting from birth. At autopsy there were found a stenosis of the cardia of the stomach and bronchopneumonia, which were responsible for death, and an unrelated anomaly of the diaphragm. The right pleural cavity was divided by a membrane extending from the base of the sixth rib forward, in arch like form, to the angle of the inferior vena cava and pericardium, where it joined with the diaphragm. The base was transparent, but the free margin contained striated muscle and a small nerve and blood vessels. It is this which makes the author feel that the anomaly is one of the diaphragm and not of the pleura. The cause is unexplained. —*Eine seltene Zwerchfellmissbildung (partielle einseitige Doppelbildung), P. Haeberlin, Schweiz. med. Wchnschr., June 9, 1945, 75: 510.*—(*J. Gerstein*)

Diaphragmatic Hernia.—A diaphragmatic hernia is a prolapse of part or all of the stomach, with or without the end of the esophagus, through a gap in the diaphragm. This gap is usually the esophageal hiatus. The hernial sac is usually covered with peritoneum, in which case it lies behind the heart. There are two types, the incomplete para-esophageal hiatus hernia and the complete hiatus hernia. The former contains only a small part of the stomach and none of the esophagus. The latter contains all of the stomach or a large section thereof, and the terminal end of the esophagus. Important in the formation of such hernia are increases in abdominal pressure, as in meteorism, congenital or acquired factors increasing the size of the diaphragmatic gap, traction by the longitudinal muscle of the esophagus on the cardiac end of the stomach, especially in prolonged vomiting, and interference in the growth of the esophagus. When the esophageal hiatus is weakened the difference in abdominal and thoracic pressures occurring with respiration becomes important. There are often no symptoms, with discovery coming at autopsy. The most common ones are pyrosis, retrosternal pain and a feeling of oppression. These occur most often at night or in early morning, are aggravated on lying down and are improved by standing up or moving around. Less frequent are symptoms of cardiac disease, anemia, ulcer in the herniated segment and strangulation.—*Zur Anatomie. Pathogenese und Klinik der Zwerchfellbrüche des Magens und des Oesophagus, H. Weber, Schweiz. med. Wchnschr., February 10, 1945, 75: 117.*—(*J. Gerstein*)

Diaphragmatic Hernia.—Diaphragmatic hernia and eventration are easily confounded clinically as well as roentgenologically. Sometimes, it is impossible to make a correct diagnosis. The hernia always occurs through a normal or pathological opening of the diaphragm through which contents of the abdomen escape into the thoracic cavity. Eventration is due to relaxation of the muscle which causes a high elevation of a portion of the diaphragm, the abdominal viscera being within the abdominal cavity. The authors

have operated on 5 cases of nontraumatic hernia and have observed 3 more cases. Only in one case was a clinical diagnosis made, in all others it was made by X-ray. A very rare location of the diaphragmatic hernia is the subcostosternal space limited by the sternum and the costal and sternal fibers of the diaphragm (foramen of Morgagni) and by the muscle bundles inserted in the posterior portion of the base of the xyphoid process (foramen of Larrey). These are generally congential hernias and sometimes are combined with a hernia of the esophageal hiatus. Often there is absence of the left crus of the diaphragm which may account for a communication with the aortic hiatus. The varieties of the most frequent type, the esophageal hiatus hernia, are: (*1*) a short esophagus with cardia and fundus of the stomach in the thorax; (*2*) the cardia in normal position but the fundus in the hernia; (*3*) a long esophagus with cardia and fundus in the hernia. The differential diagnosis has to exclude traumatic hernia and eventration. In the latter case the leaf of the diaphragm is seen in the X-ray film above the abdominal viscera and the stomach is generally U-formed, whereas in a true hernia it has hour-glass appearance. Faradization of the phrenic nerve causes a descent of the diaphragm in eventration, whereas in the true hernia there is no change. Pneumothorax and pneumoperitoneum may be of importance for the differential diagnosis. The authors did not use phrenemphraxis for diagnostic purposes as they believe that the innervation of the diaphragm is of utmost importance to prevent recidivation of the hernia. An upper left paramedian laparatomy was done as it was felt that the abdominal approach presents a smaller risk than the thoracic. The hernia sac was not resected and the immediate and late results were satisfactory.—*Hernia diafragmatica, R. Vargas M. & A. Larach N., Rev. méd. de Chile, August, 1945, 73: 687.—(W. Swienty)*

Embolectomy in Pulmonary Embolism.—The operation described by Trendelenburg for embolectomy of the pulmonary artery or its main branches was used in a case of massive pulmonary embolism. A 43 year old woman had a long abdominal operation for carcinoma of the colon. She apparently made a good recovery, but two weeks following the operation she suddenly developed all the signs of pulmonary embolism and was moribund within twenty minutes from the onset of clinical symptoms. The operation described by Trendelenburg was employed, and many large clots were removed from the main and from the right and left pulmonary arteries. The patient made a good recovery in spite of the fact that respiration had been absent preoperatively for fifteen minutes, and cardiac action had stopped for sixty seconds. Twenty-one days later, when the patient had completely recovered, another embolization occurred. A second Trendelenburg operation was performed and this was initially successful. However, the patient died seventeen hours postoperatively due to aspiration pneumonia. Apparently the brain had been damaged irreparably by the temporary anoxia, and the patient never recovered from coma. At autopsy large fresh thrombi were found in both femoral arteries. The operative site in the pulmonary artery was free from clot, and only small emboli were found in branches of the pulmonary artery. The brain showed microscopic areas of degeneration of ganglion cells.—*Erfolgreiche Trendelenburg'sche Operation einer fulminanten Lungenembolie, R. Nicole, Schweiz. med. Wchnschr., December 8, 1945, 75: 1080.—(H. Marcus)*

Pulmonary Embolism.—A total of 162 episodes of pulmonary embolism in 108 patients is analyzed. Pleuritic pain occurred sixty-six times in 54 patients; pulmonary consolidation, sixty-seven times in 59 patients; episodes of dyspnea, fifty times in 43 patients; anginal pain, thirty-seven times in 26 patients; shock, forty-two times; sudden loss of consciousness, eleven times; tachycardia, sixty-two times in 53 patients; fever as sole manifestation, three times; sudden death, in 3 patients; unsuspected pulmonary

embolism was found at autopsy in 3 patients who had died of other causes. The source of the embolism in 90 cases was the veins of the legs (only 60 of these had definite evidence of thrombophlebitis); in 2, the arm veins; in 7, pelvic veins; in 9, mural cardiac thrombi. Predisposing factors were operations in 64 cases; nonsurgical disease in 14 cases; trauma to an extremity in 6 cases; peripheral vascular disease with thrombophlebitis in 24 cases. In 50 per cent in which electrocardiograms were taken the pattern of acute cor pulmonale was found. Leucocytosis and slight increase of the icterus index were frequent.—*Clinical Syndrome in Patients with Pulmonary Embolism, E. L. Sagall, J. Bornstein & L. Wolff, Arch. Int. Med., October, 1945, 76: 234.*—(*G. C. Leiner*)

Infarct Cavity.—A patient with mitral stenosis and insufficiency was admitted to the hospital in heart failure. Fluoroscopic examination of the chest showed a dense infiltration in the right middle lobe, in addition to the characteristic cardiac configuration. The infiltration was at first thought to be a primary or secondary tumor, but later on breakdown and cavity formation was observed in that region. The cavity healed without leaving a trace. Although there was no history of the typical symptom complex of pulmonary infarction, the absence of pathogenic microorganisms in the sputum, including the absence of acid-fast bacilli, and the quick disappearance of the cavity in a known case of mitral stenosis in heart failure, make the diagnosis of infarct cavity extremely likely.—*Infarktkaverne der Lunge mit Ausgang in Heilung, A. Urech, Schweiz. med. Wchnschr., November 17, 1945, 75: 1004.*—(*H. Marcus*)

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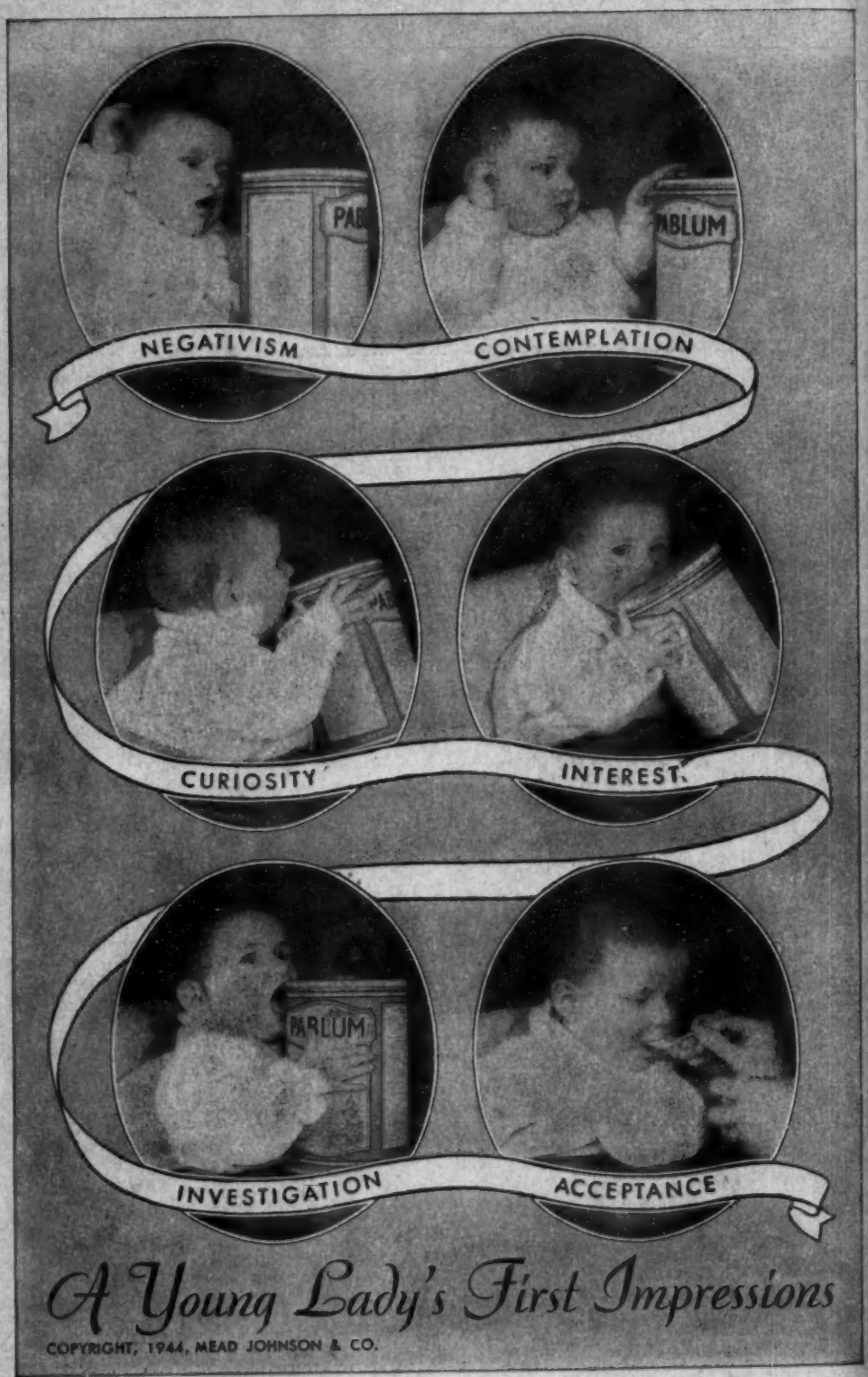
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